The Truth about COMPUTERS — Page 11

International Management Digest®

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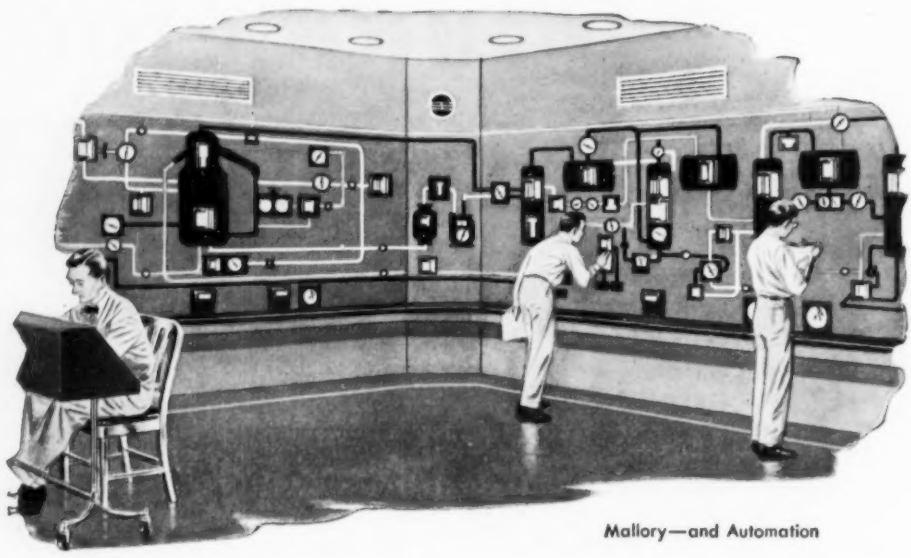

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LOOKING AHEAD

World Affairs

Watching the Cat

It is a moment when businessmen everywhere are anxiously waiting to see "which way the cat will jump"—toward more recession, or toward a renewed expansion in world business.

Just as the U.S. recession seems to have touched bottom (page 9), Europeans have become more worried about their own situation. They have heard some less-than-favorable reports from the United Nations and other learned bodies. And they have seen some sharp statistical evidence of slow-down close to home.

For the first time in years, **German** industrial production showed a year-to-year decline in May. **British** businessmen report excess capacity and falling profit margins. In **Holland**, order books show declines in all industries save electronics.

Some Europeans are taking a new look at their business problems. Many have automatically assumed that the U.S. recession is responsible for the downward trend in the world, that the U.S.A. must "do something" about the problem.

Not so, say some important observers. Even before the U.S. recession began, a slowing down of activity was apparent in Europe—partly the result of strict anti-inflation measures and reduced imports. The prescription, says Roy Harrod, the influential British economist, is not to wait for the Americans but "for European countries to take their own measures to stimulate their economies and their import requirements . . ."

This advice is being heeded. One government after another has taken steps to ease credit. And you see here and there new investment allowances and tax incentives for businessmen, as well as easier terms for installment buying.

These steps are taken cautiously. The fear is ever present that such moves could stimulate the same inflationary forces that Europe was fighting a year ago. For governments, the next few months will be a time of precise policy juggling and calculated risk.

Britain Bets on Expansion

Nowhere is the risk greater than in Britain. Yet there the die is cast for easier credit and the encouragement of business expansion.

London feels now that it has room for maneuver. A vigorous anti-inflation policy and lower prices for imports that Britain must buy, among other things, have combined to strengthen sterling. Gold and dollar reserves have risen smartly. Indeed, the Treasury expects nothing worse than a levelling-off of reserves in the next few months, when seasonal pressures on the pound are at their peak.

Britain's money managers have not forgotten that reserves are still too small, and that expanding the economy too quickly could easily upset the present healthy payments surplus—by drawing in heavier imports just when British exports (which have held up well) meet a decline in other world markets. But politically as well as economically, London thinks the gamble is justified.

Turn the page for more WORLD AFFAIRS

The Latin Americans Hope

No one hopes more than do the Latin Americans that renewed expansion will come soon in Europe and the U.S.A. to raise raw materials prices.

Actually, the Latin American economies turned in a better performance last year than many persons believed possible. Per capita output rose to a record $293, according to the United Nations. That compares with almost no growth in 1956. Agricultural production showed the greatest gain, but industrial progress was maintained.

The net inflow of foreign private capital had "far-reaching and favorable influences," says the U.N., rising 60% above 1956 to $1,600-million. Of that, the U.S.A. put up $1,200-million (half of that for petroleum, mostly in Venezuela). But note that private investment from Europe doubled—to $347-million, and Europeans are investing more in manufacturing.

Latin Americans know that they will do well just to hold these gains in 1958. There will be less capital from Europe, and industrial growth will suffer from a reduced ability to import.

But against that somber outlook is (1) the fact that the U.S.A. and other international lenders are making more financial help available to Latin America, and (2) the hope that raw material prices may rise as with a turn-around in business in Europe and the U.S.A.

Progress on the Seaway

Last month, the first commercial ship sailed serenely through new locks and channels in the International Rapids section of the $1,000-million St. Lawrence Seaway. Dignitaries from the U.S.A. and Canada hailed the project as a new "main street" of commerce for North American trade.

In September, power from Seaway generators will flow to industrial plants in the U.S. and Canada. And in April, 1959, Seaway channels will be open to full 27-foot draft vessels.

Shipping savings will be substantial—an estimated 23% on small industrial machinery to Rotterdam, for instance; 38.5% on lard to Amsterdam; 20% on road-building machinery to the British Isles.

Overseas trade is expected to rise by 400% to 500% by 1970, when connecting channels between the Great Lakes have been deepened.

The Trends of Business

Venezuela is paying dearly for some of the big projects launched by former Perez Jimenez government. An official report says that the steel mill under way at Puerto Ordaz will cost $120-million more than the plant is worth; some $57 per ton of capacity compared to $35 in the U.S.A. The report blames "vagueness" of the contract signed with an Italian group. Venezuelans fear their big petrochemical development, also begun under Perez, is in a similar fix.

Note the expansion of the electronics industry. Britain's is burgeoning (IMD, July 17, p17). Now reports from France show that electronic sales advanced 17.5% last year, electronics exports rose by one-third, and that the industry is in the midst of a major expansion. Meanwhile, Japan's electronic's producers are setting up the first overseas electronics trade promotion center—in New York.

Watch Central America's "Common Market" scheme. The five nations have signed a limited free trade treaty, and will soon sit down to decide what items will be included under the treaty terms.

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Speeds — 4.8 to 32.1 kmph (3 to 20 mph)
Reverse, 5.0 kmph (3.1 mph)

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15.3 m^3 (20 cu yd) heaped
Payload — 25 tons
Diesel Engine — 280 horsepower
Speeds — 4.8 to 32.1 kmph (3 to 20 mph)
Reverse, 5.0 kmph (3.1 mph)

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AUGUST 1958
VOLUME 13 NUMBER 8

International Management Digest®

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The Readers Report . . .

Consulting on Costs

Sir . . . Following your excellent digest of "A Better Way to Measure Profit?" in the June issue, I am happy to learn that Direct Costing is being recognized for its true value.

I feel that a "get-together" of accountants with practical knowledge and/or considerable theoretical know-how would be extremely profitable for everyone. I should therefore be very happy to hear from any of your readers with experience in Direct Costing, and to exchange knowledge thereon.

Your magazine undoubtedlly does a great job in furthering advancement in many fields of management.

A. F. Bartlett

COST CONSULTANT
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ENGLAND

The Wealthy American

Sir . . . I greatly appreciated your "Challenge to America" in the March issue. It is not enough, as we see it, that the U. S. A. sends help to underdeveloped countries in the form of loans and equipment; the Americans have to come with it; that is, they must bring the help and not try to take it back to the U. S. A. in the form of interest or amortization since the underdevelopment is of such a degree that these countries are unable to pay anything back . . .

What we really need are wealthy Americans, willing to get their reward in local exchange, to help us keep communism at a distance.

Claudio W. F. Bock

CHEMICAL ENGINEER
SAO PAULO, BRAZIL

Suggestion Box

Sir . . . Do not overlook the feasibility of re-publishing a good article on occasion . . . Reader reaction would be your guide. For instance, as a new reader, I was interested in what Sr. Lalinde said in the Readers Report about the article on "What Makes a Salesman Successful." Since I missed it, would you send me a tear-sheet?

Albert Escolme

MANAGER
ALL AMERICA CABLES & RADIO
SAN SALVADOR, EL SALVADOR

Sir . . . We have received two issues and we think that you emphasize big organizations and their problems. We would like to learn how small concerns face their problems . . . How should management strike the balance between up-to-date methods and the old ones? . . .

Shri Gajanan Weaving Mills
SANGLI, BOMBAY
INDIA

Sir . . . Your magazine offers the attentive reader many descriptions of plants, ideas, and suggestions which can be used in a small enterprise as well as a large one. I am just missing one point which I wish to suggest.

I am very much interested in the social efforts which have to be made . . . in order to bind the personnel . . . to the business. I would welcome detailed reports concerning large firms and concerns in various countries, dealing with working time, working conditions, benefits . . . Businessmen are more and more interested in the international labor market and its effects, with the steadily growing efforts toward intergration in many parts of the world.

Heinrich Blezinger

BERLIN-FRIEDENAU
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And a Thank You

Sir . . . I wish to take this opportunity to thank you for INTERNATIONAL MANAGEMENT DIGEST. I have already gotten many benefits from the new ideas published therein—for streamlining the management of our trading firm.

Yu-Yung King

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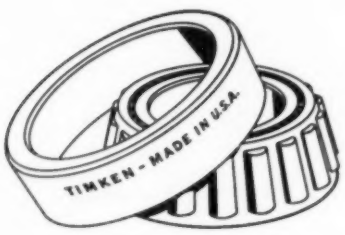

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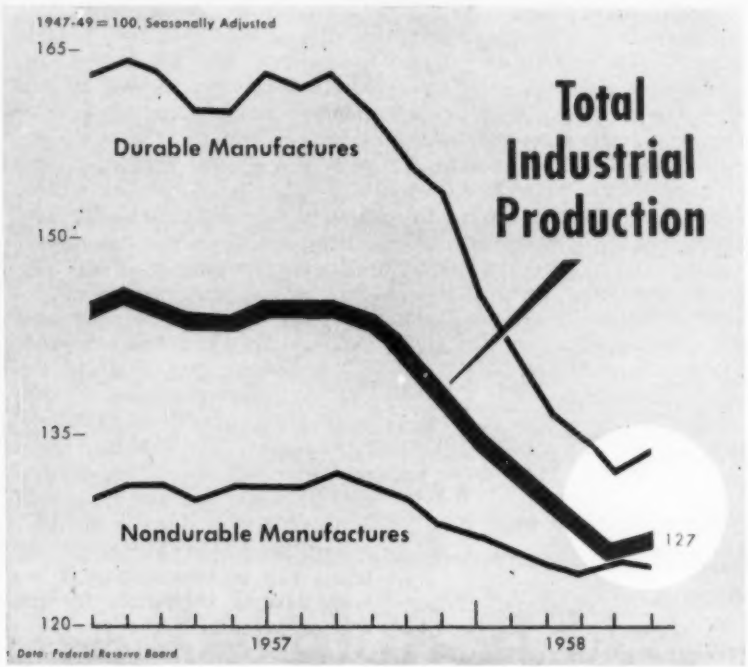


Is This the Upturn?

Possibly—but so far no strong expansion of U. S. business is in sight. Here are some things that the world's businessmen should keep in mind.

THE CHART ABOVE details one of the most important single items of business news in 1958: After eight months of decline, the Federal Reserve index of U. S. industrial production turned up one point. This index is the official measure of the American economy, and the gain in May (and the probability of another advance when June's results are tabulated) has strengthened the position of Washington, whose policymakers predicted that the recession would end without strong counter-measures.

But even the most cheerful observers have their fingers crossed. For as *Business Week* pointed out, "there is a limit to how many angels of hope can be made to dance on a single-point" index.

AS INTERNATIONAL MANAGEMENT DIGEST went to press in July, some other promising signs had turned up. Indeed, they suggested that the American recession of 1957-58, which set the world business community anxiously looking to its defenses, has touched bottom.

An end to the recession is one thing; a solid new expansion is another. The consensus in July was that the upturn will be relatively slow in coming. In autumn perhaps, or not until mid-1959. Meanwhile, businessmen should keep these perspectives in mind as they read the day-to-day economic news from the U.S.A.:

—**The "midsummer lull"** is now in effect, and some of the July-August business indicators may make the recession look worse than it really is. Thus unemployment climbs seasonally as June graduates and summer job-hunters find fewer opportunities this year. There are the factory vacation closings and shut-downs as Detroit retools for 1959 models.

—**Nonferrous metals and steel** will feel the hot-weather lull. Barring a dramatic increase in world tension, commodities do not yet seem ready for an important rise in demand. Inventory liquidation may be slowing in the U.S.A., but it is not over. Recent price strength in some of the metals is probably explained largely by Washington's plans for subsidy programs.

—**U. S. foreign trade** will probably hold to present levels, with no great change in prospect. While exports have dropped off 20% from 1957's highs (remember the Suez crisis), imports have surprised everyone by resisting the recession, dropping only a few percentage points. Partly as a result of this, many nations have been insulated against recession breezes from North America, and have added to their gold-dollar reserves.

—**The likelihood of a sudden inflationary upturn** does not seem very strong. A more sober and conservative national mood is upon the U. S., shared by businessmen and consumers alike. Both groups may have the puritanical feeling that the economy got into trouble because they had been spending too wildly, expanding too much, indulging themselves too readily.

But there is more to the conservative mood than psychology. *Business Week* singles out two factors that are causing worry:

The first is the continuing fall in business' planned outlay for plant and equipment—the most dynamic factor in the 1956-1957 boom. Today, many industrialists are embarrassed with excess capacity, and they indicate that by the fourth quarter of 1958 their capital spending (at an annual rate) will be off 20% from 1957's high $37,000-million. Some fear the decline will go into 1959.

The second factor is the prospect of unemployment continuing at the present level—7% of the workforce. There is a suspicion that one force keeping unemployment higher than the nation is accustomed to is a sharper rise in labor productivity, as businessmen struggle to cut costs and encourage efficiency.

Worry about unemployment

may, in turn, discourage the public from opening its purse wide, and indulging in the kind of buying that ended the 1953-54 recession overnight.

Yet the consumer has held up his end so far. Retail sales, primarily food and soft goods, are hardly off at all. One of the most important "plus" factors in the U.S.A. today is the steady increase in personal income, thanks to a broad rise in government salaries and some increases in wage rates. This almost automatically insures that consumption will stay up in the months to come. And do not forget the steady increase in the money supply, and cuts in interest rates which have already had a marked effect on home-building.

Some observers weigh the factors this way: Rising government spending will tend to cancel out falling business investment. That leaves the consumer, with lots of savings and rising income, as the critical element in the equation. Fortunately, Mr. & Mrs. Consumer are in a good position to buy. Unfortunately, they seem to have been a bit disenchanted with some of the important durable goods (such as autos) offered to them. The question, then, is will they buy? And when? ●

When Businessmen Differ . . .

. . . profits are lost, trade slowed. Now a new treaty will help speed settlements, and make more world businessmen "arbitration-conscious."

DISPUTES BETWEEN BUSINESSMEN are inevitable. And as the volume of world trade expands and more businessmen enter into contracts with foreign customers, suppliers, licensors, partners, more disputes take on an international hue. Quick, cheap, and final settlement of these differences has been the dream of the supporters of international commercial arbitration.

In June, their hopes took a long step forward. A United Nations Conference on arbitration adopted a new convention on arbitral awards. It was approved by 45 leading trading nations; by year-end, many of them are expected to ratify the treaty, putting the new rules into effect.

Ultimately, successful arbitration depends on the good will of the disputing parties. For that reason, and the fact that no treaty has ever yet persuaded all governments to adopt uniform law, the ideal of universal arbitration remains unattained. But the new treaty represents progress. And at the least, it will make more businessmen "arbitration-conscious."

Businessmen hate to talk about contract troubles. Indeed, lawyers complain that businessmen often refuse to think about the possibility of disputes. But most traders are familiar with the advantages of arbitrating their differences—especially international ones—rather than going into slow, expensive litigation in the law courts.

There are now three types of international arbitration:

—National arbitration groups that perform international functions when foreign businessmen are willing to submit disputes to them. The London Court of Arbitration is well known, along with the American Arbitration Assn., the Moscow Court, and the Japan commercial arbitration body. In addition, there are groups important to specific trades—such as the London Corn Trade Assn., the Bremer Baumwollborse, the Union Lyonnais de Marchands de Soie.

—Another type may be set up between two or more states. The Inter-American Commercial Arbitration Commission is now being rejuvenated after years of relative inactivity; national committees and panels of arbitrators are being reestablished in Latin America. The IACAC hopes to persuade traders in the Americas to use the standard IACAC clause in contracts.

—Finally there is the international system, exemplified by the International Chamber of Commerce's Court of Arbitration, now 35 years old. Many businessmen, especially Europeans, have used it for years. It has almost all the advantages of neutrality: arbitration through a neutral body by a neutral arbitrator at any location in the world.

The ICC has been promoting international commercial arbitration since its founding in 1919 (IMD, May '57, p 11). Businessmen who use the ICC arbitration clause in their contracts can go first to the ICC conciliation committee, where neutral conciliators will study the argument and propose a voluntary settlement. A high percentage of disputes that come to the ICC are so settled.

But if agreement is impossible, the parties propose, or the ICC nominates, an arbitrator (or perhaps three). The arbitration can take place anywhere; the arbitral award is final and binding.

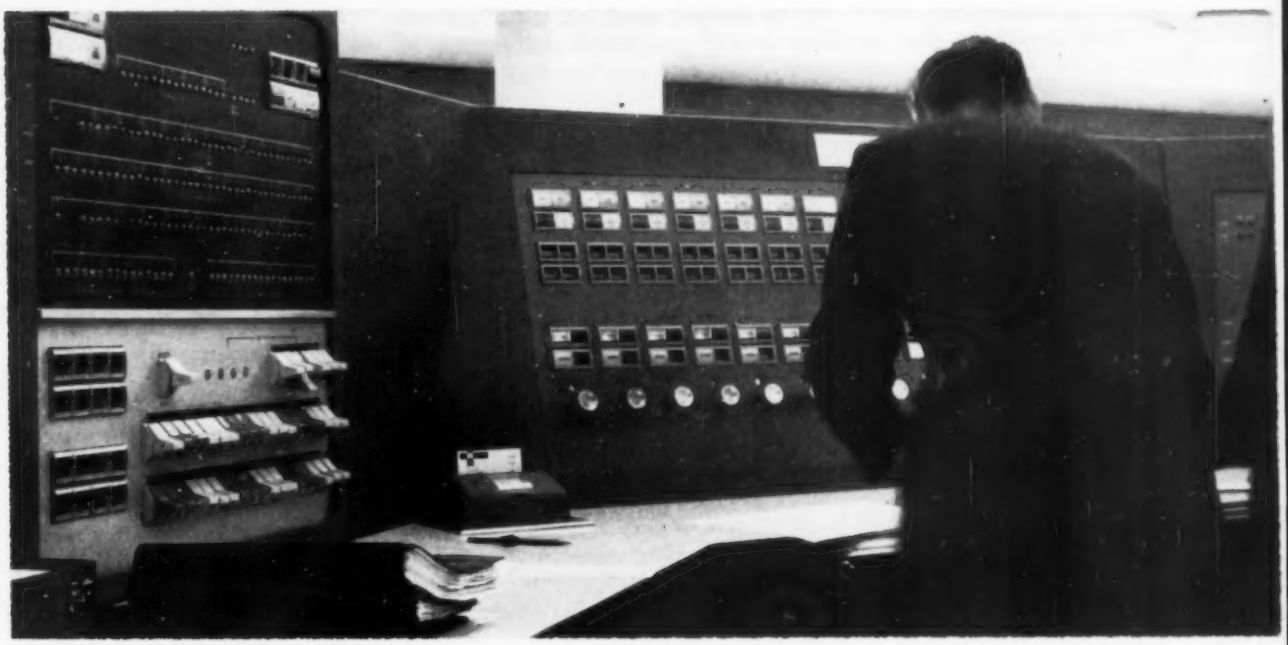
But it is one thing to make an award, another to enforce it. Contracts can be broken, and it has been next to impossible for the winner to enforce the award in the courts of some countries.

The Geneva arbitration agreements of 1923 and 1927 recognized the validity of awards, but left some loopholes on enforcement. Now the ICC hopes that the new treaty will be ratified, for it considerably tightens up enforcement.

The key clause is "that an award should be enforceable whenever it is shown to have been made in accordance with a valid agreement between the parties involved," and that the court involved "need not concern itself with . . . the law of the country where the award was rendered." The basic position of the ICC has been all along that a contract between businessmen—and the agreement to accept arbitration—should be respected and not overturned on the technicalities of one nation's law.

But the new treaty cannot go all the way; delaying actions are sometimes possible, and national laws may still offer loopholes that can invalidate an award. So ICC is trying—through its member groups in 38 nations—to make business more "arbitration-conscious," to urge governments to improve laws that bear on arbitration. For example, ICC has just opened an office in Bangkok to provide information and advice on arbitration in Asia. ●

"Decision-making starts where clerical work leaves off. And
Popular reports on the big ma-



The Revolution Has Just Begun

False starts have clouded the business potential of big electronic computers. But their day is coming. Here is what American business has learned about computers—and the revolution that they herald.

Digested from BUSINESS WEEK, June 21, p68

"WHEN THE HISTORY of our age is written, I think it will record three profoundly important technological developments:

"Nuclear energy, which tremendously increases the amount of *energy* available to do the world's work;

"Automation, which greatly increases man's ability to use *tools;*

"And computers, which multiply man's ability to do *mental work.*

"Some of our engineers believe that of these three, the computer will bring the greatest benefit to man."

Ralph J. Cordiner, chairman
General Electric Co.

Just four years ago, in Louisville, Kentucky, U. S. A., a new industrial revolution started. It began amid great expectations—with the installation of the first large electronic data-processing machine.

Since then, it has become a most perplexing, but inevitable, revolution. It is perplexing because American industry, which has adopted these complex electronic "brains" with almost religious fervor, often seems unsure of what to do with them after it has them. Often, early results have fallen short of the great expectations.

Yet the revolution is inevitable because computers still hold the key to new systems of organization for the world's sprawling giants of industry, commerce, government.

The revolution is young. Even in technical use, computers are not much more than 10 years old. And their first non-technical, full business use dates back four years.

But some patterns are beginning to emerge from the American business experience so far:

—In early 1954, it was estimated that perhaps 50 U. S. companies could "eventually use electronic brains." Instead, by mid-1958, over 1,200 corporations, plus government and military units, have installed more than 1,700 computers.

—Out of the exaggerated claims in early years, there has come a chorus of complaint about high computer costs and poor results.

—Yet no computers have been turned back. At least 3,000 more are on order, at prices from $300,000 to $2-million.

—In some companies, the computer has become the focal point of a power struggle between the men who have grown up with present systems and the militant "computer men" who want to reshape the organization around their expensive charges

I. The Total System

In this struggle, the odds are on the computer men.

For industry has been in search of a revolution. Industrial complexes modeled essentially on centuries-old military lines have become bogged down. As much as half the cost of administering a major company is involved in processing "information".

Four years ago, no one knew what computers could do. The emphasis was on the machine—translations from man-hours to ma-

"Decision-making starts where clerical work leaves off. And here is where the machine starts reorganizing business."

Computers begin on page 11

chine time were made glibly: "The computer can do in two hours what 400 clerks do in a day."

Now, the easy talk about "clerical replacement" has faded. In its place is the realization that the computer is something different.

The computer may be basically just a faster and more powerful adding machine. But it bears to the adding machine the same relationship as a nuclear missile does to a machine gun. Just as the missile makes for profound changes in the military and political posture of nations, so does the computer require reorganization of the strategy and forms of the business employing it.

Already, the computers handle a host of tasks. They are making up payrolls, designing products, sending out bills, controlling production schedules, manipulating refinery runs, routing freight cars, developing a Concordance of the Bible, forecasting sales.

And, to be sure, some of these computer tasks are paying for themselves. Yet in most instances, industry is still experimenting—and, as in any experimental era, failures outnumber successes.

Yet the vision of electronic management continues to grow. Computer men now talk not in terms of a single "self-amortizing application," but of "total systems." An electronic computer would be the very heart of a business. As new orders feed in, the center would automatically determine, order, and allocate material and labor, schedule production and delivery, send out bills and make payments, project changes in demand, and supply accurate and immediate reports to management.

Man would still determine policy. But machines would implement it. How soon? Theoretically, it could be done now. In practical terms, within a generation.

II. Business Applications

Within the technical area, computers are being used for a multitude of tasks—from designing missile components to charting the orbits of Saturn's moons. Technical users—universities, governments especially—are usually satisfied with the computer's speed-up of their research.

But in its report, *Business Week* concentrates on "business" uses: clerical work, decision-making, policy determination.

So far, the emphasis has been on the clerical, since management always analyzes its communications in terms of numbers of clerks and pieces of paper.

For a clerical aspect, take the payroll. Names, wage rates, hours, production, special conditions for each of 10,000 employees can be fed in at one end of the computer, checks come out the other. The routine is well-established. None of the individual problems as such challenges the machine's computing ability, but the computer can still do the job faster.

Decision-making starts where clerical work leaves off. And here is where the machine starts reorganizing a business.

Take an inventory problem. A storeman realizes the supply of an item is getting low. He tells the supervisor; the supervisor and his boss—plus someone from the financial office—decide how much to order after weighing production and market projections; the purchasing department decides where and how to buy and fills out forms.

But in a computerized set-up, the entire inventory problem can be programmed into the machine and handled automatically—from determining the inventory of an item required under varying conditions to printing and sending the order at the proper time.

The question of policy is more uncertain. No doubt that the machine can deliver more information faster to help management. Yet the only thing the computer is doing so far in this area is forcing managers to a reappraisal of what information they really need.

With all these potentialities, why all the complaint?

III. Self-deception

Probably in no other area of management has there been so much self-deception as in the early computer days.

Popular reports on the big machines often estimated operating costs in the area of $300,000 yearly, based on a rental of $25,000 a month. But that is only a starter. A system is a lot more than one machine.

Actually, expenses for a minimal large-scale system will run to at least $675,000 yearly. Far more hover around $900,000. Medium-scale systems are about a quarter to a third of these figures. Small or "baby" computers, with limited applications, might run $100,000. [See "Management Methods," on another page of this issue, for news about one-time, service-bureau computer operations.]

The equation of machine time with clerical effort has often proved a delusion. Rarely have enough clerks been replaced to cover even the low estimates—much less the real costs. A more probable (though less proveable) saving is not in reducing the work force, but in making its expansion unnecessary.

In more than half the instances, payroll has been the first administrative job thrown to the computer. Its translation to a machine is relatively easy. Yet experienced users say now that transferring any already mechanized operation—such as payroll—to electronic processing as a self-contained operation is often uneconomic.

There are, of course, some areas where a computer can succeed purely as a "faster office machine:"

—**Where the product itself is paper work,** and "production" is the constant manipulation of millions of figures—as in insurance.

—**Where large numbers of arithmetical changes** must be made regularly—say for an electric utility company and its billings.

—**Occasionally where speed alone can mean savings,** as in processing paper work prior to a bid on a big engineering job.

As a result, insurance companies and utilities are among the most enthusiastic computer buyers in the U. S. A.

But for the general run of companies, mere mechanization of existing routines often fails to utilize the computer's potential.

General Electric Co., now the most "computerized" company in the world, learned its lesson with

its first computer at Louisville. It thought that it could run the payroll in two hours a week. Management soon found that it took 36 hours, and that a quarter of that was waste—paycheck sorting, for instance, that could be done equally well by three clerks in half a day at 1% of the machine time cost.

But look what happens to the computer "payroll" operation at one GE installation today:

The basic data not only provides weekly paychecks, but also complete accounting on labor distribution and precise labor cost per item. With supplemental material, the machine develops a complete bookkeeping system on job costs, automatic project billing, and a "responsibility reporting system" which provides information to various executive levels.

To do this meant a radical change in early accounting methods—cutting across department lines—and the acceptance of the computer as a "system tool" and not simply a fast office machine.

IV. A Long, Hard Look

Before computer uses advance much further, current and potential computer owners must take a long hard look at two questions:

—In terms of money, is what we are doing with a computer actually worth the cost?

—Could we do the same job some other way, say by reorganizing an existing system? Or by buying much less expensive office equipment?

Paradoxically, savings credited to computers are frequently only indirectly related to the actual capacity of the machine.

Even an already-mechanized system must be revamped for computer application—and formerly sacrosanct methods will disappear. Computer manufacturers concede that if companies made the same intensive analysis of their systems —and the necessary changes—without the spur of an incoming machine, they might sometimes eliminate the need for one.

Yet even a company that has discovered this may buy a computer. The arrival of the computer helps modernize existing methods. And the annual cost of the machine may be a small "learning price" for applications that will appear later. For example, an electric utility that started with a customer billing operation found this could be translated into analysis of load factors and equipment use. By rearranging its equipment, the company has met growing demand without additional capacity.

The greatest potential of all may lie in the electronic delivery of management information. But up to now, actual accomplishment along this line may be the most illusory of all.

Machine analysis of markets and sales, long-range planning, Operations Research, and generally "faster reports" are being experimented with. But this is an area where tough-mindedness is called for in determining what is really needed from a computer. The

continued on next page

Computer Do's and Don't's

Telling any one company exactly what it should do is almost impossible. But by now, both users and manufacturers have absorbed enough experience to develop some general do's and don't's for companies considering electronic data processing. Here's their advice:

Be prepared to question the contention that your present method is working well. You may be talking to the man who designed that present method.

Be prepared to run into unpredictable delays and costs, into organizational and communication problems.

Be prepared to find that descriptions of present procedures are inadequate and often untrue. Descriptions often represent the original hope, rather than the actualities.

Don't pick your machine until you're quite sure exactly what you want to be doing with your system at least five years hence. Then pick the model that will do that job. Tailoring new corporate systems to limitations of specific machines can defeat its own purpose.

Don't simply try to superimpose electronics on top of existing programs. All you get is redundant costs. Don't consider a computer as a fancy clerical or tabulating department. If you can't get a different result, qualitatively as well as quantitatively, you probably do not need a computer.

No matter what the business, don't leave it to individual departments to decide what should be done, or why, or how. A computer has to be of paramount interest to top management—and management must start with a definite point of view on the final result it wants to accomplish.

Don't waste a machine on jobs that can be done in other ways just as economically—simple sorting operations, or storage of masses of information that do not require manipulation. All you are doing is keeping the machine tied up away from more productive uses.

Don't assume any computer will be a cure for current system ills. If you haven't the courage to clean up your systems first, no computer will do it for you.

Consider the physical limitations of the computer. Input and output are as important as computing speed—and sometimes the time they take will cancel out the computer's speed.

Consider all the costs, the hidden and preliminary, as well as the ostensible running expenses.

Remember that publicity can boomerang. If you decide to get a computer, keep your mouth shut about what you're "going to do with it"—until you've done it succesfully.

Don't assume you can duplicate another company's successful applications. Businesses differ too much in size, present systems, customers, purposes, and operating methods.

criterion must not be how fast the machine can deliver facts, but whether those facts really require a computer, and how fast management can take action on the facts once it has them.

V. Finding the Right Men

The biggest weakness to date, suggests an official of a computer manufacturing firm, is that the machines "have been in the wrong hands"—with the electronic engineers and mathematicians who understood the computer but rarely the company. Today, it is generally accepted that it is easier to teach the machine to someone who understands the business.

Also, company financial men—controllers—are often the bosses of the computers. And there is a serious debate about the controller's pre-eminence. Says the computer man: "The controller usually is not young. He operates from fairly rigid and well-defined traditional concepts. These things need a new approach."

The real question is not which individual has the nominal responsibility, but to what degree a company top management is willing to change its traditional concepts. This may involve human relations problems—of executives who owe their position to a particular system, of various department heads jockeying for control of the computer, of suspicious labor unions. The computer men declare that total systems will not work until computer departments get a status of their own together with authority to act.

In the future when conservative managers retire, the computer men will have their chance.

Complete corporate centralization around a computer system may never come. Some early attempts have failed—badly; original plans overlooked the fact that when a company has multiple plants, each does things differently for good reason.

But more and more new companies, or new divisions, will be initially created around an electronic control system, with a better chance to integrate properly from the beginning. That will bring a new kind of company, and a new kind of management. ●

Nanny to the American Tourist

Ralph T. Reed

AMERICAN TOURISTS storming the stores and shops of Paris, Copenhagen, Tel-Aviv or Montevideo will have an added weapon in their hip pockets by October 1st, due to the forethought of the American Express Co. and its president, Ralph T. Reed (above).

On that day, Reed's global organization will issue a new kind of travel credit card—the most comprehensive ever written—entitling its bearer (whose credit rating has been vouched for) to everything from vodka to airline tickets solely on the strength of his signature.

Credit cards are tomorrow's way of doing business. And American Express—world-famous for its travelers checks and conducted tours—was not going to be caught short in this race to make charging easy. With its 400 offices around the world, and its years of experience in shipping and banking, credit cards appeared an essential next step in the firm's campaign to make the world free—or seemingly free—to American tourists.

The American Express credit system will be bigger and broader than anything now available. Card holders will be able to charge all transportation services, whether they travel by air, rail, steamship, bus or chauffeured limousine. They will sign for food, beverages and entertainment at thousands of U. S. and overseas cafes, for hotel and motel accommodations, sightseeing tours, and automobile rentals. Their credit will be good at certain florists, gift and specialty shops.

Reed's latest move is only another step in American Express' constantly expanding—and extremely profitable—program to be of greater service to travelers. Not long ago he initiated a merger of his company with Hertz Rent-A-Car, so that automobile rental would be a part of American Express service in the U. S. A., Europe, and parts of Latin America.

American Express has been in the travel and finance business for more than a century, but the type of service offered has changed with the needs of the times. In 1890 the firm brought out its now-famous travelers check, a negotiable paper that soon became almost as acceptable as currency.

With the advent of high-speed air travel, American Express has continued to broaden its services to travelers. "What Thomas Cook and Sons has been to the British traveler for more than a century," *The Economist* notes, "the American Express now is to the American—only more so."

An American planning a trip to Europe, South America, or the Far East can leave all his problems in the hands of American Express experts. They will plan his itinerary, indicate what he should see and do, get him hotel and travel reservations, advise him on equipment and clothes he will need, and hand him a neat stack of checks that will pay for what he needs in Bangkok or in Brooklyn.

Now they can also offer him a car—with or without a chauffeur—and by fall they will be turning him loose with a certificate of almost unlimited credit.

The services offered by the firm in its 400 offices vary from country to country. Although the parent company is not licensed to engage in banking in the U. S. A., an overseas subsidiary runs banks in major cities of Europe and Asia. Directly or through subsidiaries, the firm also runs an armored car service in New York, operates a hotel in Mexico, and acts as payment offices for electric and telephone bills in several U. S. cities.

American Express plans for the future call for jet tours that will whisk a tourist around the world in four weeks, and give him a sampling of all the earth's wonders and gift opportunities. ●

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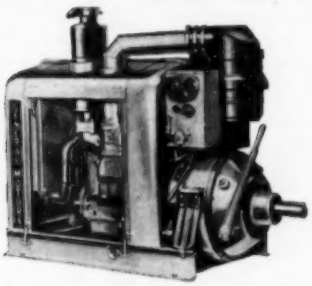

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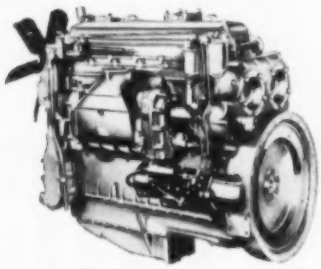

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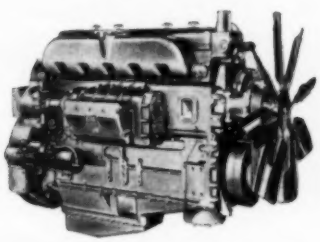
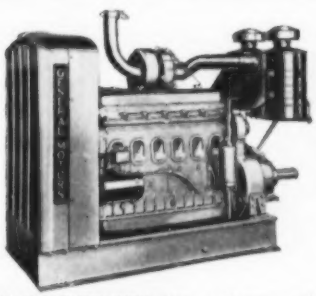


SERIES 110—This time-proved, heavy-duty 6 with 300 Rated Brake H.P. has a new side-mounted blower... is shorter, lower, more compact than ever. Used as a single engine or twin unit, up to 578 Rated Brake H.P. Economical operation—costs less to buy, less to operate, less to maintain.



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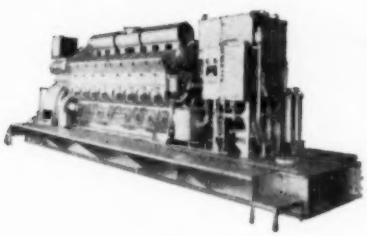

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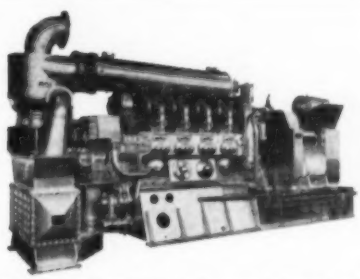

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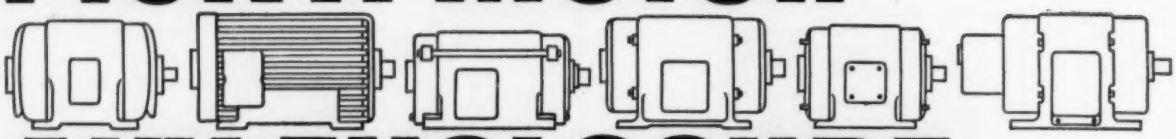

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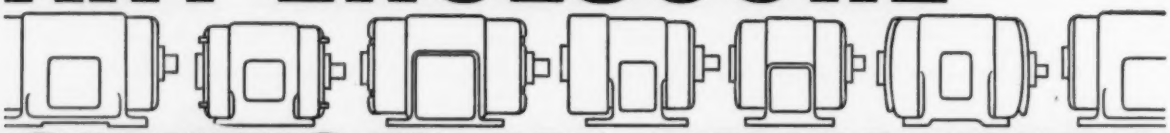
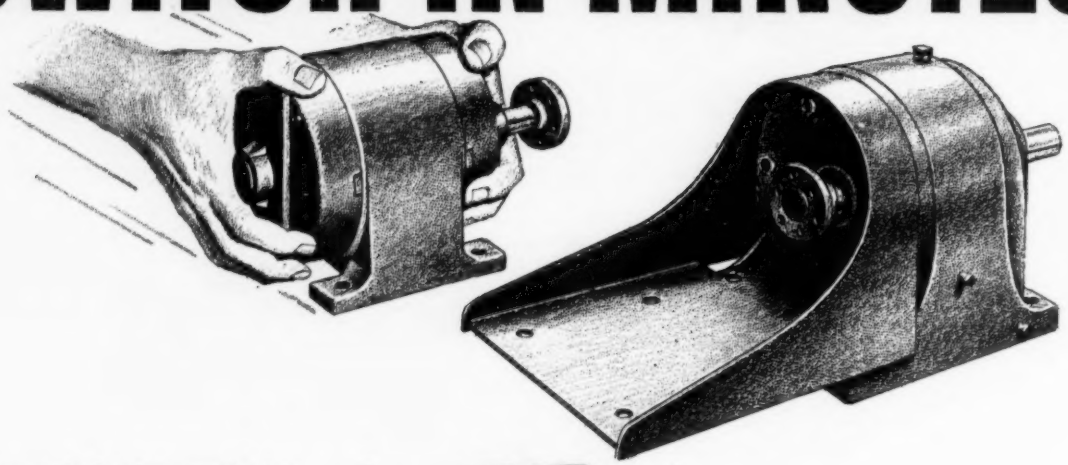


SWITCH IN MINUTES



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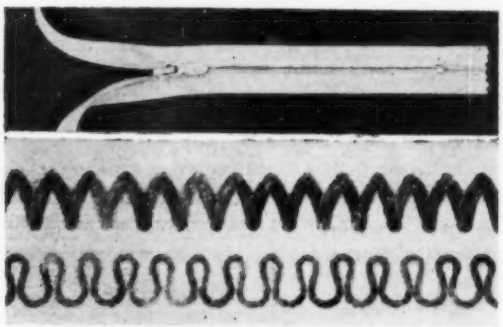
Technology

Atomic Rays Aid Textile Progress

Radioactive isotopes are being put to work for a variety of tasks in textile processing, including the sensing of mass and moisture content of fabrics. Some 50 U. S. textile firms already are licensed to use isotopes. An interesting future possibility is the polymerization of resin finishes by means of high-energy radiation. Also under study is the graft polymerization of silicones to produce water repellant finishes for fabrics. (Textile World, June, p 87)

British Firm Develops Nylon-Filament Zipper



A zipper being readied for market by Imperial Chemical Industries, Ltd., England, will have interlocking surfaces made by intertwining extruded nylon filaments. A spiral filament will be used on one side, and one of serpentine shape (bottom sketch, left) on the other. A special slide fastener will lock them together. The result, according to ICI, is a closure that is integral with the cloth, light, flexible, and nearly invisible. (Product Engineering, June 16, p 8)

Aluminum Can Prospects Look Bright

Makers of aluminum are fighting harder to capture a substantial share of the can market from steel in the years to come. A recent survey by an independent engineering firm indicates that aluminum may get 5% of the U. S. market in five years, and as much as 20% within 10 years. This despite the fact that aluminum costs more, and often can not take the same abuse as steel. But aluminum also has major advantages: the light-weight metal saves on shipping costs; makes an excellent base for decoration and design; and can be made in a wide range of can sizes and styles by impact extrusion or deep drawing. Also, machinery and facilities for making aluminum cans often require no more than a modest capital investment. (American Machinist, June 2, p 75)

Soviet Advances in Ultrasonics

Ultrasonic waves are being used in Russia to speed up fabric dyeing, pelt treatment, and descaling of boilers, McGraw-Hill World News reports. Fabrics that normally take five hours to dye are being processed in 25 minutes with the aid of oscillators and a high-frequency generator. A Soviet fur factory has cut pelt-cleaning time from an hour to 10 minutes by ultrasonics, and heating engineers at some Russian plants now use a sonic device for preventing salt deposits from collecting on boilers, or for removing the salt scales.

Turn the page for more TECHNOLOGY

Scientists Study Metric Advantages

What are the possibilities of such "nonconformists'" as the U.S.A. and Britain changing over to the metric system? The question has been raised many times, but now it is being seriously studied again by a committee of the British Association for the Advancement of Science. The group will report by the end of 1959 on the "practicality, implications, consequences both international and domestic, and the cost of a changeover to the metric system or the decimalization of weights, measures, and coinage." (Chemical Week, June 28, p 52)

Wood Substitute Made from Cement

Products of the laboratory soon may supplement the world's lumber supply, according to U.S.A.'s Battelle Memorial Institute. Battelle scientists have developed a Portland cement-based material that has many of the desirable properties of wood. Now being produced on a pilot-plant scale, the unnamed material has the same density as wood and can be nailed, sawed, and glued. It is fireproof, rotproof, and does not expand in humid atmospheres. Conventional woodworking tools can be used on the material. The product came out of research aimed at finding a substitute for the cherry wood blocks used by engravers, but broader usage now seems likely.

Turbine-Powered Tractor Under Test

An experimental crawler tractor recently assembled by U.S.A.'s Allis-Chalmers Manufacturing Co. substitutes a gas-turbine power unit for the conventional diesel engine. The turbine develops horsepower equivalent to a diesel. Noise level, while of a different pitch and character than the sound of a diesel, is about equal to a conventional tractor. (Engineering News-Record, June 12, p 57)

Russians Use Solid Gasoline

Russian scientists are reportedly using undisclosed additives in order to solidify gasoline and transport and store it without tanks at —60 to 50 C. The gasoline is reliquefied before use by a press that can be installed in planes, cars, and tractors. Excellent results are claimed for the gasoline at the Soviet Antarctic station. Meanwhile, the Russian Academy of Science has reported making solid gasoline using plastics. (Chemical Week, June 21, p 73)

Packaging Industry Shows Its Wares

The accent was on plastics at the National Packaging Exposition held recently in New York. Monsanto Chemical Co. displayed plastics cheap enough to compete with paper in single-use containers. Continental Can Co. disclosed its new linear polyethylene, Conolex, a film of high gloss, crystal-like clarity, and good temperature range. Aerosol bottles for oil or alcohol-based liquids made of nylon were shown by E. I. du Pont de Nemours & Co. (Purchasing Week, June 9, p 26)

Salt Water Cooling Towers

Food and chemical engineers will be watching with interest the operation of a salt-water cooling tower soon to be built by a U.S. oil refinery. California Oil Co. needed some 45,000 liters per minute of cooling water for a new catalytic reformer; but fresh water was scarce, and a constant supply of salt water from primary sources appeared too expensive. The decision was to recirculate salt-water. The firm had built a smaller salt-water system two years ago—said to be the only one of its kind—and its success has led to present plans. (Chemical Engineering, June 16, p 181)

Karl Ziegler

Flanked by young disciples, this pioneer in low-pressure polyethylene still divides his long day between scientific inquiry and smart selling.

WHAT NEW PLASTICS and production techniques will come out of the $1.2-million addition to Germany's Max Planck Institute for Coal Research is any man's guess. But both the spirit and the facilities for intensified research will owe much to the genius of the Institute's director, Karl Ziegler, shown on the cover and above.

To executives of the world's chemical industry, the name Ziegler is almost synonymous with the term polyethylene—and more specifically, with a valuable low-pressure process for making this booming plastic. The Ziegler process, now licensed to some 20 chemical firms in various parts of the world, may be a way to improve both the properties and price of polyethylene.

Professor Ziegler, however, is more than an innovator in the chemical process field. His name is respected because he combines the talents of a top scientist with the finesse of an acute businessman. Some five or six years ago he pulled off his white smock to promote his process around the world. Ziegler has been almost as much an entrepreneur as a chemist ever since, and rumor has it that his travels and business contacts have yielded him about $7-million.

"I am a professor, not a businessman," he recently told a visitor to his laboratories at Mulheim on the Ruhr. "But why shouldn't a professor make the most of what he discovers?"

Ziegler's earnings have been shared by the Institute, and have made possible the current expansion program that will double existing facilities. His employers —the Max Planck Society, which supplies a third of the Institute's budget, and Germany's coal mining industry, which supplies the other two-thirds—give him a free hand, and allow him to pursue any aspect of research he chooses.

At 59, Ziegler has surrounded himself with over thirty brilliant and admiring young assistants. He has turned administrative duties over to one disciple, Wilhelm Lindemann, and the direction of scientific research over to three or four other able young men.

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As for Ziegler, he suggests wryly: "I would be content, at the end of my time, to have found a few facts of chemistry that won't compare poorly with what others have found." (*Chemical Week, May 31, p 62*) ●

Scientists Study Metric Advantages

What are the possibilities of such "nonconformists'" as the U.S.A. and Britain changing over to the metric system? The question has been raised many times, but now it is being seriously studied again by a committee of the British Association for the Advancement of Science. The group will report by the end of 1959 on the "practicality, implications, consequences both international and domestic, and the cost of a changeover to the metric system or the decimalization of weights, measures, and coinage." (Chemical Week, June 28, p 52)

Wood Substitute Made from Cement

Products of the laboratory soon may supplement the world's lumber supply, according to U.S.A.'s Battelle Memorial Institute. Battelle scientists have developed a Portland cement-based material that has many of the desirable properties of wood. Now being produced on a pilot-plant scale, the unnamed material has the same density as wood and can be nailed, sawed, and glued. It is fireproof, rotproof, and does not expand in humid atmospheres. Conventional woodworking tools can be used on the material. The product came out of research aimed at finding a substitute for the cherry wood blocks used by engravers, but broader usage now seems likely.

Turbine-Powered Tractor Under Test

An experimental crawler tractor recently assembled by U.S.A.'s Allis-Chalmers Manufacturing Co. substitutes a gas-turbine power unit for the conventional diesel engine. The turbine develops horsepower equivalent to a diesel. Noise level, while of a different pitch and character than the sound of a diesel, is about equal to a conventional tractor. (Engineering News-Record, June 12, p 57)

Russians Use Solid Gasoline

Russian scientists are reportedly using undisclosed additives in order to solidify gasoline and transport and store it without tanks at —60 to 50 C. The gasoline is reliquefied before use by a press that can be installed in planes, cars, and tractors. Excellent results are claimed for the gasoline at the Soviet Antarctic station. Meanwhile, the Russian Academy of Science has reported making solid gasoline using plastics. (Chemical Week, June 21, p 73)

Packaging Industry Shows Its Wares

The accent was on plastics at the National Packaging Exposition held recently in New York. Monsanto Chemical Co. displayed plastics cheap enough to compete with paper in single-use containers. Continental Can Co. disclosed its new linear polyethylene, Conolex, a film of high gloss, crystal-like clarity, and good temperature range. Aerosol bottles for oil or alcohol-based liquids made of nylon were shown by E. I. du Pont de Nemours & Co. (Purchasing Week, June 9, p 26)

Salt Water Cooling Towers

Food and chemical engineers will be watching with interest the operation of a salt-water cooling tower soon to be built by a U.S. oil refinery. California Oil Co. needed some 45,000 liters per minute of cooling water for a new catalytic reformer; but fresh water was scarce, and a constant supply of salt water from primary sources appeared too expensive. The decision was to recirculate salt-water. The firm had built a smaller salt-water system two years ago—said to be the only one of its kind—and its success has led to present plans. (Chemical Engineering, June 16, p 181)

Karl Ziegler

Flanked by young disciples, this pioneer in low-pressure polyethylene still divides his long day between scientific inquiry and smart selling.

WHAT NEW PLASTICS and production techniques will come out of the $1.2-million addition to Germany's Max Planck Institute for Coal Research is any man's guess. But both the spirit and the facilities for intensified research will owe much to the genius of the Institute's director, Karl Ziegler, shown on the cover and above.

To executives of the world's chemical industry, the name Ziegler is almost synonymous with the term polyethylene—and more specifically, with a valuable low-pressure process for making this booming plastic. The Ziegler process, now licensed to some 20 chemical firms in various parts of the world, may be a way to improve both the properties and price of polyethylene.

Professor Ziegler, however, is more than an innovator in the chemical process field. His name is respected because he combines the talents of a top scientist with the finesse of an acute businessman. Some five or six years ago he pulled off his white smock to promote his process around the world. Ziegler has been almost as much an entrepreneur as a chemist ever since, and rumor has it that his travels and business contacts have yielded him about $7-million.

"I am a professor, not a businessman," he recently told a visitor to his laboratories at Mulheim on the Ruhr. "But why shouldn't a professor make the most of what he discovers?"

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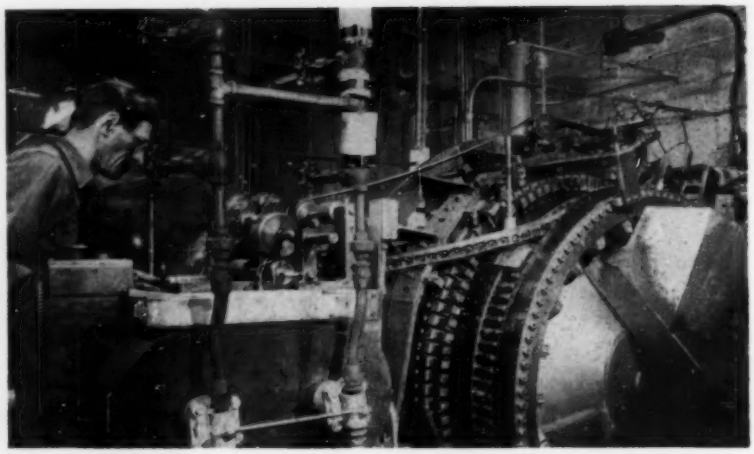

AUTOMATED machine produces an accurately molded part each time the wheel turns. Economic production is possible only at 500,000 units a year.

Precision, Speed, Low Cost

Digested from PRODUCT ENGINEERING, June 23, p 68

HERE IS A NEW ROAD to low-cost, high-volume production of molded rubber parts. With the equipment shown above, a U. S. firm today is producing rubber moldings to extremely precise tolerances— dimensions within ± 0,075 millimeters—at rates of up to 200,000 pieces per day.

The fully automatic machine gets its accuracy and speed from 104 self-registering molds on two vertical 1.2-meter wheels (photo) mounted on a common axle. The outboard wheel contains the fixed mold cavities; the inboard wheel, the movable force plugs. Each wheel is a steam chest which supplies heat for the cure.

All thermosetting elastomers, including the newer silicone and polyurethane rubbers, are adaptable to the process. The compounded material is fed from a two-roll plasticizing mill (at left, in photo) into an area between the mold cavity and force plug at the top of the wheel.

As each mold closes, it punches out a precise quantity of material. The part passes through a complete molding cycle during one revolution of the wheel, then drops into a hopper and onto a conveyor for a light post-cure. Where necessary, flash is removed by tumbling the parts with dry ice and wooden blocks.

A major advantage of the new process is its continuous nature, which permits very precise control of time and temperature. Each part makes its complete circuit under the same pressure as the next.

With conventional platen molding, by contrast, one operator must handle two or three presses for any kind of speed.

Also, single-cavity molds on the wheel permit accurate and uniform application of pressure, which means greater precision and less finishing costs.

Close flash control allows the same tolerances for all dimensions, whether along the force plug direction or perpendicular to the force plug.

Direct feeding of material from the plasticizing mill to the mold wheel insures part uniformity and quality. A precise charge to each mold is guaranteed. This helps control flash and uniformity of parts.

The process also has its limitation. The size of the parts can not be greater than the distance between the die location; with present equipment, this means a top diameter for moldings of about 3 centimeters.

An even more marked limitation of the process is its high cost for tooling and set-up. Only firms that can use 500,000 units of a given molding a year will find the process economical. Large economies will be realized only when more than a million parts a year are scheduled. ●

New Jobs for Invisible Doors

INVISIBLE DOORS — curtains of flowing air—have grown in six years from an engineering trick to a valuable aid to management. Developed in 1952 by the Swiss engineering firm of Sulzer Brothers, such air "doors" are now giving worthwhile service on four continents — in banks, department stores, markets, specialty shops. Their use in factories and plant areas now is being planned.

Invisible doors draw an unseen curtain against heat, cold, odors, smoke, even insects and animals. A Nevada (U.S.A.) gambling casino installed a 12-meter-wide door of this kind, and then tested it by trying to entice hungry hounds into the gaming rooms. The dogs wouldn't pass. Yet men could walk through the air curtain without discomfort.

Air currents serving as doors may be from a half meter to two meters thick. The air moves from overhead grills to suction grates on the floor at a speed of about 500 centimeters per second. The steady flow sets up a barrier that is almost as effective as a conventional door.

Engineers expect air curtains to become a major aid in chemical, pharmaceutical, and food processing plants, where odors, humidity and temperatures must be controlled. And they may well be useful in isolating metal-plating, spraying, and other obnoxious operations. *(Factory Management & (Maintenance, June, p.* 94)●

Line Will Carry Super Voltages

HIGHER VOLTAGE means greater ability to bring electric power from its source to where industry needs it. Since the first use of electricity, a constant effort has been made to carry higher and higher voltages over distances with a minimum loss.

Marked progress in this field is expected to come from a full-scale protoype transmission system which the General Electric Co. will build in western Massachusetts, U. S. A. The planned 7-kilometer line will carry power at up to 750 kv (750,000 volts)—far higher than any existing power line in the world and more than double the highest voltage now used in the U. S. A.

Voltages have been steadily raised during the past 50 years. The top transmitting power in the U. S. A. is 375 kv. In Europe, where power sources normally are farther away from industrial centers, more economic emphasis has been put on super-voltage development. Some lines in Sweden, Germany, France, and Russia carry up to 400 kv.

Higher voltages have been carried by short experimental lines in the U. S. A. and Russia, but the planned G. E. line is the only one that will actually carry power. The line will be built to parallel a 125-kv line of a public utility. Initial operation is scheduled for 1960 with full 600 to 750 kv operation in 1961. The line then may be altered to transmit a million volts of power.

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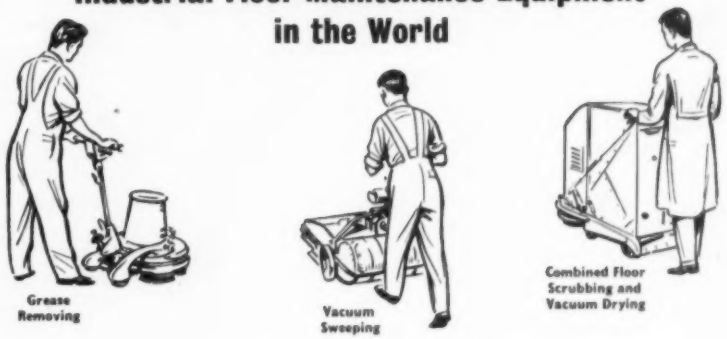

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How Does a Company Grow?

1. An affinity for growth products or fields.
2. Organized programs to seek and promote new business opportunities.
3. Proven competitive abilities in the present lines of business.
4. Courageous and energetic management willing to take careful risks.
5. Good luck.

AN OLD ENGLISH nursery rhyme brought up to date begins like this:

Executive, executive, quite competitive,
How does your company grow?

The answer, unlike the nursery rhyme, has a lot more reason than rhyme. To find the answer—summarized in the five factors above—the U.S.A.'s Stanford Research Institute (SRI) compared 210 "gifted" companies with 169 companies with growth performances well below average. The criterion for selection was growth in sales from 1939 to 1949. Then these companies were kept "under observation" from 1949 to 1956.

An investigation of growth in earnings will come later. But a SRI economist notes: "There is considerable evidence that sales growth is one of the principal ways of increasing earning power as well as perpetuating the life of a company."

Some of the guideposts to growth are set out in the *Proceedings* of the Third Annual Industrial Economics Conference held by SRI earlier this year (this 148 page book is available from SRI, Menlo Park, California, U.S.A., for $5).

A single management decision, says SRI, can have a tremendous impact on the destiny of a company. As an illustration, a company that makes radios can look on itself as a radio manufacturer or an electronics manufacturer. As a radio manufacturer, it can concentrate all its competitive resources into one field. As an electronics manufacturer, it must disperse its resources, but it has a wider range of opportunities.

Of similar importance are decisions on geographical markets, types of customers, over-all rate of growth desired, and earnings objectives.

Many companies remain too long in slow-moving or declining product fields before exploring areas with more attractive futures. Slow-growing companies do not have programs to seek out and develop new growth opportunities—or do not spend enough on them if they do. And it should be noted—in connection with the second factor of growth above—that the emphasis is on the word "organized."

This emphasis gives credit to long-range planning as a central, integrating force that ties together product development, market development, and other forward-looking programs.

The importance of doing the present job well seems an obvious factor, but it was stressed by many of the growth companies. A Stanford economist put it this way: "Present earning power is needed to develop future earning power and present market acceptance is needed to build future market acceptance."

As for taking carefully planned risks, some companies find themselves in such attractive positions that extreme conservatism is a satisfactory policy. But in most situations, the researchers conclude, extreme conservatism "is the most risky course of all."

The Good Luck factor logically recognizes the possibility of Bad Luck. But the SRI study cites evidence that the luck factor can be offset by being prepared for the unforeseen through well-organized but flexible long-term planning programs. To take advantage of unforeseen opportunities, a company must be able to recognize them at the earliest possible moment. And it must be able to move swiftly—at the right time and with the needed resources.

Throughout the study, SRI researchers were impressed with the importance of an intangible management spirit. Their conclusion: Good executives like to work in growth fields. And the five growth factors are direct reflections of the personal qualities of top-ranking management men:

—They like to make progress, and to accomplish things; they are not satisfied with things as they are.

—They recognize the importance of constantly adjusting to changing conditions and new forces, and they like to take the lead in making changes.

—They seek new ideas and opportunities and do not wait for them to be brought.

—They recognize the luck or risk element, but they take steps to offset it; they expect setbacks and do not become afraid of further ventures.

—They have great confidence in the future and in their personal abilities to contribute to and share in this future.

—They realize that an individual cannot be "all things to all people" and that their companies must also limit their interests to reasonable and attainable goals. ●

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Can Inventory Be Controlled?

Inventories play a vital role in business, but there has been a lack of guiding principles of inventory control.

Now, a new study shows how companies are searching for better inventory methods and standards.

DO YOU HAVE a negative attitude toward inventory control? If so, you have a lot of company, according to a new study by the U.S.A.'s National Industrial Conference Board. "A discrepancy in the petty cash fund," the NICB report says, "may evoke more concern than the accountants' writing off $100,000 for surplus and obsolete inventory."

Encouragingly, though, the Board also found evidence of an awakening interest in methods of inventory control. Many companies, pressed for expansion capital, have discovered that assets and cash in the bank are two different things. "Inventories may be assets," comments the NICB, "but they cannot buy new plants or meet a payroll."

The fact is that nearly 30% of the total assets of the average company is tied up in inventory. Inventories play a vital role in economic production, customer service, and the basic profits of business.

I. Is There a Way?

The Board found that many of the over 100 companies cooperating in its study have no formal long-range policy or objectives on which to base inventory decisions. A few executives say they prefer it this way—they like the "flexibility." But many more say they simply have not discovered a really good means of keeping inventories to a minimum.

There are many reasons for inventory imbalances. But one of the basic reasons is the failure of management to find out the root troubles that are leading to the imbalances. Too many companies, the NICB concludes, treat the symptoms and not the sickness.

The problems are formidable, to be sure. A good system of inventory requires a reliable forecast of business conditions—and forecasting is treacherous. In practice, inventory decisions are usually linked to current and short-term business conditions; consequently, action on inventories often accentuates swings between excesses and shortages. Part of the U.S.A.'s recession problem today relates to the tremendous inventory buildup during the 1955 boom—and the abrupt and continuing liquidation since last year.

The best safeguard, reports the NICB, is a "carefully conceived and permanent control program executed through a clear-cut delegation of responsibility and authority." There is considerable difference of opinion, however, on where to place the responsibility for inventory management.

In smaller companies, it is common practice to delegate the responsibility to the treasurer or controller. Larger companies place reliance on individuals, committees or special departments. Companies with divisions usually tap the division manager, even though the over-all program may be directed by a central organization.

A prime difficulty seems to be that top management is far removed from the points where inventories are generated. And there are natural biases toward large inventories. The salesman wants delivery on receipt of an order; the production man wants plentiful stocks of raw materials and components to make scheduling more "efficient;" the purchasing man is afraid of being caught short.

To stop this "hoarding" of inventory, management often makes the mistake of getting involved in the details of inventory accounting—confusing the collection and review of data with actual control.

II. Two Kinds of Reports

Companies with the best control systems tend to use two general types of inventory reports: detailed reports for day-to-day administration, and summary reports for top-level information.

Detailed reports usually contain information on (1) item description, (2) opening inventory, (3) quantity of orders received, (4) shipments, (5) production orders entered, (6) production finished, (7) required stock level, and (8) actual and available stock balances. These detailed reports are used by production expeditors, production managers, plant managers, and sales departments.

Summary reports are usually arranged by inventory groups, expressed in a currency value. At best, they are arranged to show conformance to inventory objectives, with comparative information to indicate trends.

These summary reports are generally distributed to middle and top management—usually as part of the monthly operating data.

As might be expected, some companies make wide use of charts and graphs, especially in summary reports. Others regard them as unnecessary or as a supplement."

Traveling inventory committees or auditors are active in some multi-plant companies, and the firms say they are quite helpful in keeping inventory programs in line. They advise local managers on inventory problems and keep top management informed on the status of inventory. (An increasing use of "task forces" to deal with inventory problems was reported in a recent article in the *Wall Street Journal.* Results are sometimes unexpected: One equipment manufacturer discovered it was cheaper in the long run to buy steel from a warehouse dealer at $8.25 per 100 pounds than from the steel mill at $7.)

III. Standards

While some managements seem content to judge their inventory situation strictly by the total money value, others are seeking standards that will measure inventory performance. Some of the standards:

Minimum-Maximum quantities: This is the most commonly-used

Off-the-Shelf Programs

countries are prepared to tackle

technique of carrying out inventory control. But it is not a substitute for inventory management, and other standards are usually used with it. Without other standards. the danger is that decisions on inventory gravitate down to the stock clerk level. And delayed posting of records can nullify effective management review.

For raw materials, stock levels reflect availability, delivery time, price, storage space, requirements for economic production, relations with the vendor, value of the item, possible changes in specifications.

For work-in-process, stock levels reflect activity of the item, economic batches, cost of the product, production losses, availability.

For finished stock, stock levels reflect past sales history, need for prompt delivery, customer order practices, danger of obsolescence, perishability, unit value, storage space, and manufacturing time.

Inventory budgets: A standard favored by many companies because top management can readily spot deviations from the inventory program. The budget fixes the responsibility for inventory management. It is also easier for management to coordinate the inventory program with sales, production, and financial policies. One lurking danger, however, is that sales and production men sometimes inflate their budgets to give themselves extra leeway.

Rate of turnover: It is sometimes based on a number of days' supply, sometimes as a ratio of inventories to sales. Companies that favor this standard say the rate of turnover is a good measure of the efficient use of inventory investments, that comparisons can be made with other years, and that top management can maintain control without becoming involved in inventory details. Division and plant managers are also left free to develop techniques of control.

Return on investment: This standard is usually applied to total operations of a plant or division, and not to inventories alone. Some companies say it is hard to separate inventory management from other factors influencing the rate of return. But companies favoring a return on investment standard feel it still gives the best indication of effective control. ●

A-B-C's of Inventory Control

H. FORD DICKIE (above), chief of production control at the U.S.A.'s General Electric Co. and one of America's top authorities in this field, stands before a graphic presentation of inventory control used by GE. The chart shows the cost of maintaining inventory through the entire manufacturing cycle in terms of dollars (vertical axis) and time (horizontal axis). And Dickie says both controls must be applied.

The raw materials panel (left) shows the protective stock base carried as "insurance." The first saw-tooth designates the receipt of raw materials, the second, usage.

Economic order quantities are found by a formula that balances the costs of machine "set-ups" and piece prices with the cost of carrying inventory; or, in the case of purchased parts, the cost of acquisition against carrying costs—plus an allowance for discounts.

The second panel—work in process — demonstrates the "A-B-C" principle which was first applied to inventory control by Dickie. A, B, and C stand for expensive, average, and inexpensive items; and the panel shows how GE builds up these costs in layers. As the items move through the shop, direct labor and overhead are added to get the total value. "A" items—few and expensive—are scheduled with a close lead time to minimize inventory investment. "C" items get longer leads.

The finished stock (behind Dickie) increases in value to show the cumulative cost of inventory: Control is maintained until the customer is billed.

Fluctuations in demand—especially seasonal — can be partly absorbed by production leveling (at completion of work-in-process). But Dickie warns that such averaging should be approached with caution: "There is a dangerous tendency," he says, "to continue longer with a high rate of production." When the business level drops, you must adjust downward, or face excess inventory.

Inventory control is also a rewarding area for cost reduction, according to Dickie. As a start, he suggests, find out the one function that costs the most to operate—and "carry out aggressive work-sampling and simplification."

One way to reduce inventory is this: If you plan to use say $100,000 worth of material in the next six months, simply authorize only $90,000 worth—and you have an automatic reduction of $10,000.

Scheduling, Dickie says, is the real key to successful control. Most of the recent advances in this area, he notes, have been concerned with greater speed and accuracy. But Dickie foresees a major breakthrough coming out of Operations Research techniques. GE already can simulate scheduling problems, and it has developed a computer that translates a sales forecast into a production schedule for up to 50 products and 24 work stations.

What worries Dickie is that future methods of control will be so radical that "old concepts of functional responsibilities will have to be substantially rearranged"—and he fears that management might just drift into a new pattern. *(Factory Management & Maintenance, June, p68)*

Off-the-Shelf Programs Aid Computer Problems

Digested from PRODUCT ENGINEERING, June 2, p28

IN EIGHT LARGE CITIES outside the U. S. A. a businessman or engineer can bring his problem to a computing center, fill in a form, and within a day or two receive a printed answer at low cost. Set-up time and expense can be cut surprisingly if the problem is one that had previously been solved on an electronic data-processing machine (see page 11).

The key to this economy is in the programming of the electronic computer—the process of feeding necessary information into the machine and translating mathematics into language it can understand.

Programming and checking the program for errors usually accounts for the biggest share of the computing bill. Computing centers "hire out" their programmers at a fee of so much per hour; programming a single problem can easily take a week, and a really difficult job as long as six months.

But if your problem has already been programmed, you are in luck. Large computing centers have a store of programs filed away in their library in the form of magnetic tape, punched cards, sheets of printed instructions. The library is like a handbook of complex formulas: All the operator has to do is choose the formula, plug in the specific values, and the computer does the rest. Because the equation and problem-solving techniques involved in many problems are similar, a relatively small number of programs will solve many different kinds of problems. If a problem can be done with one of these off-the-shelf programs, costs drop sharply and the answer comes in hours, not weeks.

Computing centers in many countries are prepared to tackle these cut-rate problems. Some are operated by the computer manufacturers themselves: Remington Rand's UNIVAC center in Frankfurt, for instance, has a large library of individual programs. And International Business Machines Corp.'s Service Bureau Corporation is laying a network of computing centers in the principal cities of the world.

IBM centers have been operating for more than a year in Paris Stuttgart, Toronto, Caracas and London. Brussels, Stockholm, Zurich are the latest additions, with other centers planned to open in Amsterdam, Sydney, Tokyo, Milan, Mexico City, Buenos Aires, and Rio de Janeiro.

Each center has available a series of "packaged" programs for a number of common problems—whether in engineering, accounting, or statistics. A data sheet and problem description are supplied. The user simply fills in the blanks and indicates the desired accuracy, and the bureau delivers printed answers—often within the same day. There is a nominal fixed cost plus a charge that varies with the complexity of the problem and the degree of accuracy required.

Although this service is only in its infancy, a number of companies have already taken advantage of it. Here are a few examples:

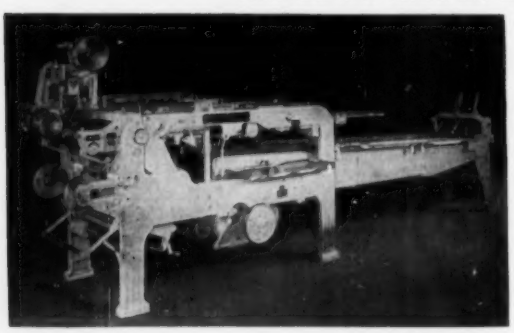
Cattlemen buy small pieces of time on the IBM 704 computer to find the cheapest mixture of feed that will still give their cattle minimum requirements of protein, vitamins and minerals.

An advertising firm in the U.S.A. used IBM computers to generate lists of words. The computer juggled letters into all possible pronounceable combinations; then the agency culled a suitable name for a new detergent.

The Service Bureau Corp. runs a recurring problem for the American Medical Association every year. AMA wants to assign medical students for internship by matching student preferences with hospital requirements. When the problem was solved for the first time, it cost $5000—which paid for programming and machine time. Now that the program is on file, AMA gets its answers for considerably less than it cost initially. ●

Increase sales, save money . . .
wrap and label your products on the
OLIVER Wrapping Machine

The versatile Oliver with one operator can handle a wide range of package sizes and shapes. Wraps baked goods, paper specialties, etc., using cartons, trays, U-boards, flat cards, or without supports. Glue-seals or heat-seals packages for utmost protection. Quick adjustments minimize down-time. Seven models. Speeds up to 50 a minute. Electric eye registers printed wrappers. Roll-Type Labeling System, Cardboard Folder-Feeder and other features save money every day.



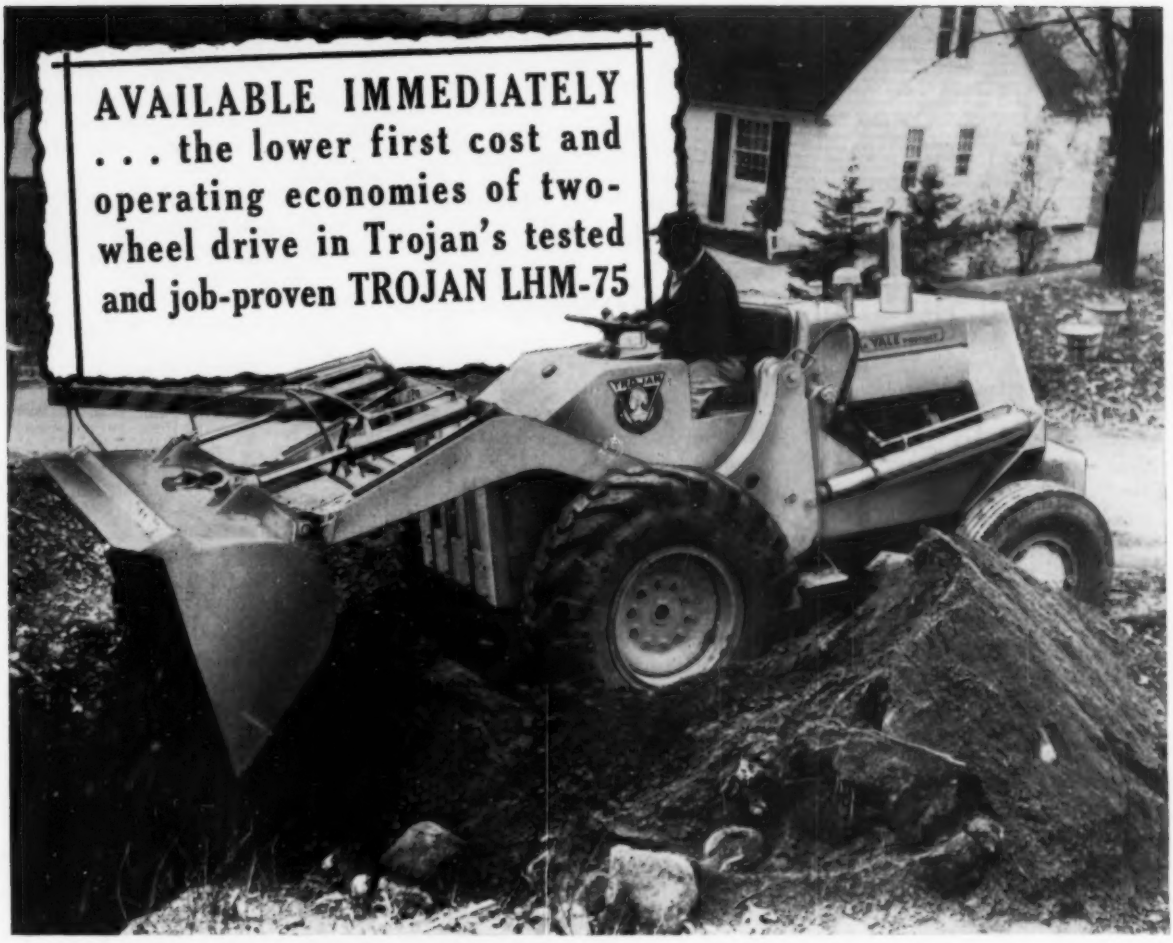
Oliver Labeler heat-seals diecut label from roll to wrapper. Imprint essential information on label just before it is applied. Change imprint items in seconds.

Write today for complete information

OLIVER SINCE 1890

OLIVER MACHINERY COMPANY
Grand Rapids 2, Michigan

discharge case, the employer must


AVAILABLE IMMEDIATELY
. . . the lower first cost and operating economies of two-wheel drive in Trojan's tested and job-proven TROJAN LHM-75

The LHM-75 is a rugged, fast, economical machine on the jobs where 2-wheel drive is practical.

Low first cost, lower operating costs . . . these are two 'musts' that contractors and public officials can depend on with the Trojan LHM-75 tractor shovel . . . Alone, these two factors are reason enough for the LHM-75 to be on the job . . . It does more jobs faster, at less cost because it incorporates big machine features with the operating economy of two-wheel drive . . . With the 1¼ yard LHM-75, you get the advantages of a big, efficient tractor shovel with a variety of quick-change attachments (back-hoe, crane hook, pallet forks, snow plow, bulldozer blade, enclosed cab) that let you forget about maintaining a yard full of expensive, specialized equipment . . . Contact your local Trojan distributor, he'll be glad to arrange a competitive demonstration — any place, any time — so that you can see outstanding performance and judge for yourself.

TROJAN* TRACTOR SHOVELS

*REG. U. S. PAT. OFF.

YALE & TOWNE | 2 & 4 Wheel Drive Front End Loaders

CONTRACTORS MACHINERY DIV. THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA

Make the punishment uniform

Take a look at these seven guides to effective plant rules before . . .

Disciplining The Employee

ONE OF THE MANY THINGS that often puzzles management is the problem of plant and office discipline: When to clamp down on an errant employee without disrupting morale and production? When to look the other way?

Discipline becomes even more complicated when management operates with a strong trade union, and strict seniority rules or the threat of an arbitration award hang over every penalty.

Out of thousands of industrial arbitrators' decisions handed down in the U.S.A. over the past 20 years, there has developed a "common law" of employee discipline. Those that operate under an arbitration clause must abide by these rules. With or without an arbitration clause, management will find that these seven common laws against which all arbitrators check discipline cases are useful guides:

1. **Make the rule reasonable.** That is the key to having rules stand up in arbitration. An employer is probably given more leeway in this area than in any other. But once in a while a rule may ask too much of the employee.

2. **Stay out of private lives.** Reasonable rule-making for the job is fine. But the employee's life away from work is his own. There is, however, one exception. If an employee says or does something outside of work that injures the company's business or reputation, the employer can reprimand him and get away with it in an arbitration.

3. **Publicize rules.** If a rule is old and obsolete, ignorance is no excuse for disobeying it. But in business life ignorance is a good excuse if the employer fails to publicize his laws. Before an employee is penalized, he must know the rule he is accused of violating. It is the job of the company to announce the rules to all employees. This can be done through handbooks, letters, memos, trade union contracts, and bulletin board notices. When publicizing rules, it is wise to announce the penalty for violation—a warning slip, suspension or discharge.

4. **Correct—don't punish.** Discharge—the capital punishment of industrial life—is not to be handed out lightly. The employer's objective is to get the job done well and at the lowest possible cost. Termination means rehiring and retraining, not to mention occasional morale problems. Unfortunately, this means higher costs. For the employee, discharge means the loss of vacation, insurance, and pension rights as well as wages. So arbitrators take a long, hard look before they uphold a discharge. The employee should be warned in advance that the offense carries a discharge penalty.

5. **Punishment should be uniform.** It is not wise to play favorites among employees. For the same or similar offense, the arbitrator expects the employer to pass out the same or similar punishment. There are these exceptions: A more severe penalty can be imposed on the leaders of a strike or slowdown than on the followers. And stiffer punishment can be assigned to the instigator of a fight than to the man defending his honor.

6. **Don't double up on punishment.** The principle of double jeopardy has been carried over to arbitration hearings. When a worker is punished for an illegal act, he has every right to believe that he will not be punished again for the same act.

7. **Grant the benefit of the doubt.** In most instances, especially in a discharge case, the employer must show by clear and convincing proof that his employee was guilty of the alleged crime. Degree of proof varies with the seriousness of the charge—and the good nature of the arbitrator who hears the case.

Here are a few sound rules developed by arbitrators giving the employee the benefit of the doubt:

—Confessions of guilt are admissible—but not if obtained through inducements or threats.

—Discharges will not be upheld generally if they are based on uncorroborated and anonymous accusation of a fellow employee.

—Hearsay evidence is admissible but only for what it is worth.

—An employee's bad past record showing a course of conduct indicating the likelihood of his having committed the offense in question may be brought up for critical examination.

(*Factory Management & Maintenance, June, p* 78) ●

Watch the £ And Not the d

"TAKE CARE OF THE PENCE and the pounds will take care of themselves," may be a valid motto in personal affairs. But in business, according to a recent report of Britain's Office Management Association, too many pounds are often spent looking after the pence too assiduously.

In the factory, business accepts reasonable tolerances both quantitatively and qualitatively, according to the nature of the work being done. But in the office, there is still a traditional insistance on 100% accuracy.

Complete accuracy cannot be guaranteed, however, no matter how many checks are applied. So the expense of trying to get it hardly seems sensible. In fact a substantial part of the work done in offices, the report states, involves checking and correcting errors.

The Association's report suggests that the problem might be handled in two ways:

By analyzing the errors that are committed—and found—according to incidence, type, and seriousness,

What can Sir Walter Windham teach the Managing Director?

1911—first official airmail flights. A service inaugurated by Sir Walter Windham carried the mail from Allahabad, across the Ganges to Aligarh.

Shipping by Clipper Cargo is not a "blue sky" idea —it is practical, modern marketing!

Today, not using air cargo is ignoring the facts about profitable merchandising.

Air cargo is no longer just a method of shipping, it's a way of doing better business; increasing your profit potential at home and abroad.

Clipper* Cargo actually cuts shipping costs! For when you ship by air there are no "hidden charges." Delivery by air saves crating, solves many basic packaging problems, and assures the arrival of your goods in perfect marketable condition.

The up-to-date executive knows that air delivery opens new markets, stimulates orders, reduces costly inventory and unnecessary warehousing. Shipping by air on a regular basis is a paying proposition!

The reason that more and more companies are calling on Pan American is that no other airline offers the completely comprehensive world-wide services of Clipper Cargo.

GET A FREE COST ANALYSIS

Ask your Shipping Agent, forwarder or Pan American office today. Discover the profit of putting your shipping problems in the experienced hands of Pan American.

*Trade-Mark, Reg. U.S. Pat. Off.

PAN AM
CLIPPER CARGO

FASTEST DELIVERY TO ALL THE WORLD

it should be possible to modify working operations to reduce the chances of errors happening and the need for checks.

Secondly, analysis should reveal where quality of output ought to be raised and where checking is really necessary.

Instead of routine 100% checks, the report suggests that sampling methods might be developed; and this has been done with success in a large typing pool, the report says. As an example of modifying working methods it notes that amounts in costing records might well be rounded off.

There are more ways than one in which office productivity ought to be improved. Another strong possibility lies in standardizing forms and conditions of trading. The Purchasing Officers Association (of Britain) has just issued a model set of trading rules that it thinks would be reasonably fair to buyer and seller and should be able to straddle, in general terms, the particular needs of individual trades. *(The Economist, June 7, p 922)* ●

In Management

● **SUGGESTION SYSTEM** at Kalamazoo Ltd., Birmingham, Britain, was started in 1908 and is still going strong. Suggestions average about 1,000 a year, and the company estimates a third of their employees are active suggesters.

One reason the scheme is successful, according to Kalamazoo, is that copies of each suggestion are pinned to a bulletin board so that everyone can see what has been suggested and what action has been taken. Other reasons:

—Top management takes an active interest.

—Acknowledgment is swift, followed by a fuller reply two weeks later.

—Anonymity is guaranteed.

—Rules are clearly set. *(Business, June, p93)*

● **MATERIALS HANDLING AND MANAGEMENT,** a two-week seminar under the patronage of the European Productivity Agency, will be held in Delft, The Netherlands, starting September 29. Cost analysis, techniques, and practical problems will be emphasized. For information write Technological University, 76 Nieuwe Laan, Delft.

● **SCIENCE SCHOLARSHIP** in industrial communities is encouraged through an experimental program financed by Olin-Mathieson, a U.S. chemical company. The firm gave $10,000 to a high school near one of its plants to recruit an "exceptional teacher" to conduct an advanced class in chemistry for a group of specially selected students. The students, chosen on the basis of a general-knowledge examination, have shown an awakened interest in science and higher education. Olin-Mathieson is considering extending the program. *(Technology, June, p120)*

● **ORDER-PROCESSING** by teletype now enables the U.S.A.'s Republic Steel Co. to fill orders in one day that formerly took a week. The firm's new nation-wide tape and teletype system substitutes one business form for the 33 used in the past. Republic spent over $1-million in rebuilding its sales-service centers, but the new system will more than pay for itself in savings of time and paperwork.

● **THE CREDIT CARD continues to aid traveling management men,** and the credit-card industry is booming. Latest purveyor of the credit card is the huge American Express Co. (page 14), which claims its new system will be bigger and broader than anything now on the market. In addition to worldwide coverage of hotels, restaurants and the like, air, bus, rail, and steamship charges will be included.

The Diner's Club, the U. S. pioneer in restaurant and other credit arrangements, continues its expansion worldwide. The holder of an American Diner's Club credit card can now charge his bills at nearly 17,000 establishments in 76 countries. Meanwhile, the Diner's Club of the U. S. A. is franchising credit card systems in other nations.

If you or your business associates do a lot of flying, note that the Universal Air Travel Plan has expanded its credit card system to include 106 major airlines.

ADVANCE offers you the world's most complete line of fluorescent lamp ballasts. From this single source you can obtain a quality ballast to satisfy any requirement. ADVANCE ballasts are engineered and built to the highest standards . . . they are world renowned for performance and dependability.

Whether you are a manufacturer of lighting equipment, a specifier or an installer of fluorescent ballasts, to be sure of the finest, write today for descriptive literature to Mr. Theodore Ley, Export Manager, Advance Transformer Co., 2950 N. Western Ave., Chicago 18, Ill., U.S.A.

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World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts
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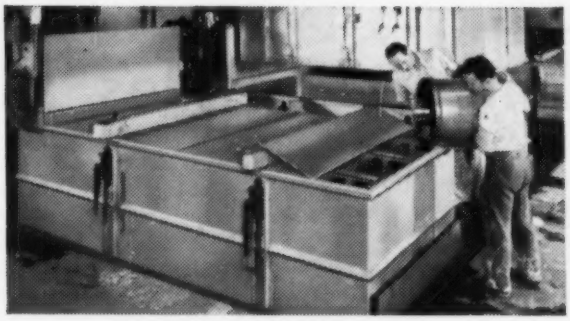

. . . FOR TEXTILES AND CHEMICALS

. . . FOR BEAUTY IN BUILDING

. . . FOR PROTECTION IN MEAT PACKING

. . . FOR SAFETY IN DAIRY PROCESSING

REPUBLIC ENDURO STAINLESS STEEL

. . . the Metal of More than 10,000 Uses

This is just the material you may need—ENDURO—made by Republic Steel, world's largest producer of stainless and alloy steels. It has proved to be the ideal material for countless uses, both functional and decorative.

As a material for product and processing equipment, ENDURO provides great resistance to heat, corrosion and abrasion. It has an easy-to-clean, lustrous, sanitary surface—solid stainless steel—with nothing to peel or chip off. Its high strength frequently permits reduction in weight.

As a material for decorative uses, ENDURO offers an attractive silvery color in various finishes which harmonize with any color or structural material. It is strong. It is easy to clean and to keep clean.

Republic ENDURO® is easy to fabricate by all modern methods. You can stamp, draw, spin, bend, form, weld, solder, emboss, etch or otherwise work it to meet your needs. It is available in sheets, strip, bars, tubing, wire and many other forms.

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REPRESENTATIVES IN PRINCIPAL CITIES OF THE WORLD

Schering's Profits Come from Sales

Close expense control, a good reporting system, unique sales incentive: They add up to profits in the highly-competitive drug industry.

Digested from SALES MANAGEMENT, April 4, p107

SALESMEN for the Schering Corp., a U.S. pharmaceutical manufacturer, are profit conscious. How they got that way, and how any company can develop profit awareness in salesmen, is summed up by Schering's sales manager, Herman Leitzow, in these words:

"If you build their morale and motivate them sufficiently, there will be little need for harping on obtaining larger orders and increasing minimum orders to increase profits.

"Aim at creating a time sensitivity in your men. It goes hand in hand with profits."

Profit Centers

Schering, once a subsidiary of Germany's Schering AG, means what it says. It is now planning to base incentive payments to division sales managers on profits rather than sales volume. The division managers, in effect, manage "profit centers." And they have the authority to go with their position —in hiring and firing, allocating sales quotas among their men, setting a budget, and approving expenses.

Each division is organized into one or more "sales control units" (most companies would call them sales territories). Headquarters maintains its control through a reporting system based on these units. At headquarters, the key man in the cost control system is the budget officer of the sales department—his colleagues call him their "officer in charge of 'cost consciousness.'" As guardian of the department's purse strings, he assists the line sales organization in setting up standards for salesmen's expenses, work organization, routing, and consumption of literature, samples, and equipment.

Schering has established a high degree of control over its sales expenses. In its salesmens' incentive plan, for instance, total bonus payments remain constant according to a six-month budget, but individuals are rewarded relative to their performance. The payments are tied to estimated sales in each sales control unit. Salesmen like the plan, says Leitzow, "because it eliminates the old feast and famine cycle of incentive payments."

The salesmen also participate in a company-wide profit sharing plan. And at least once a year, they compete in a special bonus sales campaign of a high-profit product. "This gives us another opportunity to reward profitable salesmanship," comments Leitzow.

Schering's most expensive sales tool—the use of free samples, a common practice in the highly competitive American drug industry—has also been brought under close control. The sales department undertook a thorough analysis of sample distribution, relating it to sales of each product. Now each territory is allotted set quantities, and Schering keeps an inventory sheet showing the number of samples received and used. (Actually, salesmen do little "sampling": representatives called "detail men" do this work.) Savings are showing up in packaging, shipping, and paperwork.

Proud of Paperwork

Of all its controls, Schering is perhaps proudest of its reporting system. The sales department's concern with paperwork dates back to an informal experiment conducted a couple of years ago. A group of salesmen simply were asked to save and return all communications received from the home office for one month. "We were able to wallpaper an entire conference room with the returns from one man," Leitzow recalls.

As one result, Schering hired a "sales editor" to be responsible for all reading matter going to the field.

Paperwork is kept to a minimum in Schering's reporting system too. Division expense accounts—employment, training, advertising, shipping, traveling, etc. — are coded with a number indicating the sales control unit to which they are to be charged. Then it is easy for headquarters to analyze and summarize the various division reports.

Summary reports from headquarters go back to the division managers in a loose-leaf binder. This "paperwork system"—and that is what it is—replaces heavy brief cases filled with cluttered loose forms.

The summary reports carry a breakdown of:

—Dollar objectives of each salesman, month by month for six months.

—Percentage of objective achieved, by control unit and division.

—Dollar sales by each control unit for previous periods, with objectives.

—Control unit sales as percentage of division sales for previous periods, with objectives.

There is also a breakdown for each product and customer category, as well as information on assignments, incentive payments, product contests, and call activity.

And some sort of "sales control" reference data is included in every summary report—it might be a national average, a performance standing in another area, or some other index.

"The key to improving expense sales ratios with the field staff is mostly a matter of selling time," Leitzow points out. "If you've taken the initiative of lessening your salesman's selling functions by reducing his paper work load and helping him improve his sales planning, he will find even more ways to stretch his selling time. Chances are he will make more efficient use of telephone calls, improve his use of waiting time, and eliminate unnecessary social calls." ●

Moving 6,200,000 m³ of sand at plant site in VENEZUELA

Construction of access roads and grading the site for a big steel mill at Puerto Ordaz on the Orinoco River was a difficult earthmoving job. The project involved 6,200,000 m³ of excavation — mostly loose sand — that had to be moved on a very fast production schedule.

The contractor, S. A. Electrificaciones Plantas Industriales Construcciones, decided that Euclid Twin-Power Scrapers were best for the job after experiencing serious problems with other scrapers. All-wheel drive provided by the two engines enabled the 5 "Twins" to maintain high speed production despite the sandy conditions, grades and wet weather.

Working 16 hours a day, six days a week, each "Twin" averaged 153 m³ per work-hour for the duration of the job. Hauls averaged 1,800 meters one way and complete cycles were made at an average speed of 48 KPM. The contractors' records show that over a period of 8,000 consecutive working hours these "Eucs" had practically no downtime except for normal maintenance.

Performance like this is further proof that Euclid Twin-Power Scrapers get more work done at lowest cost. The Euclid Dealer in your area will be glad to provide complete information and a production-cost estimate for your earthmoving work.

Two engines with a total of 518 h.p. and big tires enable the "Twin" to move heaped loads of 15 m³ over difficult haul roads and soft fills.

All-wheel drive provides power and traction for steep grades and severe job conditions where other scrapers can't be used efficiently.

GENERAL MOTORS OVERSEAS OPERATIONS • 1775 Broadway, New York 19, N. Y, U. S. A.
EUCLID (GREAT BRITAIN) LIMITED • Newhouse, Lanarkshire, Scotland

EUCLID PRODUCTS

Mr. Tack Sells Selling . . .

. . . as well as air-conditioning. These two activities add up to a nice international business for a British firm.

Digested from BUSINESS, June, p76

"DON'T KNOW what they think is the point of sending me here. I've been on the road for twenty years. I'll bet I could outsell all of them."

These thoughts are voiced by many of the salesmen who are asked to take the refresher course in salesmanship offered by Tack Air Conditioning Ltd., London.

The Tack organization is a unique combination of two businesses — selling air conditioning equipment, and giving courses in salesmanship, sales management and human relations.

It all started many years ago when George and Alfred Tack began sales training and refresher courses for their own group of companies. Their courses proved such a good thing that in 1938 they decided to expand their service to include other companies. Today, Tack claims to have the largest personal sales training courses in the world. In the next twelve months courses will be extended to Norway, Sweden, Denmark, France, Italy, Switzerland, Australia, and India.

It is probably fair to say that the Tack courses manage to assemble, if not the most hostile audience possible, at least a decidedly truculent one. The reason is simple: no one likes to be told that they are not doing their job well. And to ask a salesman who has considerable experience to take a course in selling can seem like a humiliating proposition.

But the organizers look at it this way: It can do no harm for any salesman to pause in mid-career and briefly look over the selling habits he has acquired, often unconsciously, over the years. For this reason the first few sessions are largely devoted to an analysis of bad selling habits. Members are asked to state truthfully if they have ever committed any of these faults.

It would be optimistic to suggest that the salesmen attending the course confess: "Yes, I do just that. What can be done about it?" But the opening few sessions certainly create interest, and gradually hostility gives way to a "wait and see" attitude.

Members are shown by means of sketches and anecdotes how the salesman looks from the buyer's point of view. Tack emphasizes that the picture presented has not been thought up by the organizers, but has been collated from the views of hundreds of buyers who form a sort of advisory panel to the Tack organization.

The Tack course resembles few others in organization. Members are summoned by electric chime to an air-conditioned (naturally) conference room.

Taking notes and asking questions are both severely discouraged. The organizers know what notes should be taken, and after each lecture a hand-written duplicated precis is given to each member.

Questions must be written on cards and handed in. They are answered either privately or at a "brain trust" session at the end of the course.

As time is the salesman's enemy, not a minute of the course is wasted. Starting times are varied each day to prevent backsliding. Visual aids are sparingly used, but there are a number of devices to help lecturers make their points. Films and a tape recorder are also used.

The material on which the course is based relies largely on the analysis of the sales sequence into stages: 1) Approach, 2) Interest, 3) Confidence, 4) Product or Service, 5) Desire, 6) Close. Most good salesmen automatically follow some sequence when putting their story across.

But how can a salesman systematize his selling method? This can be done by what Tack calls a "selling sentences" technique. The salesman should summarize his main selling points into "benefit sentences." If he memorizes them he can modify his sales talk to suit each individual customer, and will not have to rely on the inspiration of the moment to sell his product or service.

To complete the program, there are "how to" sessions on overcoming a buyer's objections, getting past the girl at the desk, and so on. At two stages there are recapitulation sessions. Salesmen who either answer questions correctly, or who can give an extemporaneous one minute talk on a subject covered by the course are given small prizes.

Parallel with this material are sessions devoted to human relations. A salesman can only sell his product or service if he sells himself. And to sell himself he must be an expert in human relations. To teach the subject is no simple task, so the Tack course is content with essentially inspirational addresses.

At the final session Alfred Tack makes his first and last appearance amid an aura of inspiration. Even persistent grumblers, who may have maintained their hostility throughout the three days, cannot help feeling they have had their money's worth from the course after the Tack performance.

The subject of his lecture is "How to be a Success;" and, of course, he has a particular recipe for this (start earlier in the day, organize your calls better). But this recipe is not the chief point of the lecture.

Alfred Tack knows perfectly well that real success comes only from wanting it enough to work for it. So he sets out to create in his audience an intense desire to succeed and a desire to translate paper plans into action.

Mr. Tack probes deep into the innermost hopes and fears of the audience. Where he finds a feeble ember of ambition, he fans it, feeds it and builds it up. At the end of the lecture many members of the audience are anxious to sell as they have never sold before.

Does the desire last? This depends entirely on the individual. But the impressive series of testimonials from leading firms suggests that it does, and that Mr. Tack has effectively sold selling—to salesmen.●

Good Reasons for Flying *Royal*

Royal attention to every detail... Your KLM plane is never off to a runway's edge, anywhere, without a thorough inspection.

A *Royal* opportunity for travellers leaving Europe... watches, cameras, perfumes, liquor on sale in Amsterdam Airport's Tax-Free Shopping Centre... world famous brands at savings of up to 60%.

KLM offers you carefully planned, *Royal* connections... time-saving, relaxingly easy... stopovers en route at no extra cost.

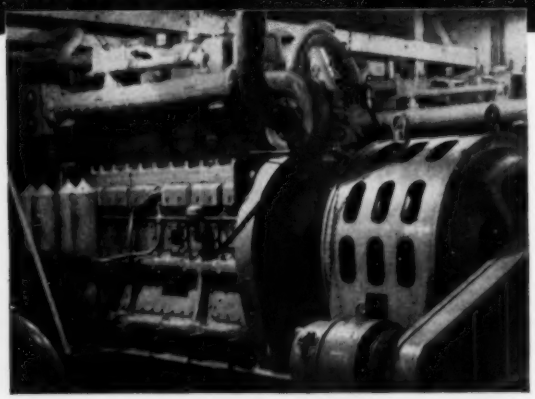
To your KLM purser and hostess you're more than a passenger - you're a person... Your interests and your comfort come first... after all, you're flying *Royal*.

FLY KLM-
THE *Royal* AIRLINE

KLM
ROYAL DUTCH AIRLINES
serving the world

40° below zero

IN CANADA'S EASTERN ARCTIC



GENERATOR SETS powered by

WAUKESHA *Diesels*

supply all electric power for mine, mill, townsite and camp

On a northern inlet of Hudson Bay, 1950 air miles northwest of Toronto—where daytime temperatures hit 40° or more below zero, and the miners are Eskimos—is Canada's most northerly nickel mine. In so remote a spot the powerhouse engines must be reliable. They are. Both are Waukesha Diesels. They drive the generator sets that supply *all* electric power for mine, mill, townsite and camp of the North Rankin Nickel Mines, at Rankin Inlet, Northwest Territory, Canada. Production is 250 tons daily; ore is high grade and shipping concentrates run 13% nickel; 2.5% copper. The two Waukesha Diesels are Model LRDBS Turbo-supercharged 6-cyl., 8½ x 8½ in., 2894 cu. in. engines.

•

Waukesha Enginators (engine-driven generator combinations) for Diesel, gas, or gasoline fuels are also available up to 800 KW. Send for literature.

Export Department

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS., U.S.A.

In Marketing

● **AN EXPORT PUBLICITY DRIVE** is under way in Sweden, sponsored by the Swedish Advertising Assn. As a first step in a more coordinated approach, a number of exporting industries will use the common "export emblem" pictured above; it will constitute a signature of Swedish origin, for reproduction in international advertising and other printed matter.

The Association's Export Publicity Group sponsors an exchange of experience among firms active in the export marketing field.

● **JOINT DISTRIBUTION in world markets** may result from negotiations between the Rover Co. of Britain and the U. S. A.'s Willys Motors. The British firm's "Land Rover" competes with the Willys Jeep; now the two are discussing team work in order to thwart competition from other producers of Jeeplike vehicles, especially the Japanese.

Rover says the idea originated from the joint venture of Austin of England and American Motors to manufacture the Metropolitan, a bantam car sold in the U. S. A.; and the marketing arrangement between Daimler-Benz of Germany and the U. S. A.'s Studebaker-Packard. (*Business Week, June 21, p 105*)

● **SALESMEN must be photographers** at the U. S. A.'s Brown-Forman Distillers Corp. Each new salesman receives a kit of camera supplies; he is supposed to take pictures of point-of-purchase sales displays in his territory so that good ideas may be passed from one area to another. Giving prints to retailers makes for good public relations, too, according to Brown-Forman's experience. (*Sales Management, June 6, p 44*)

It takes a world of products to make a ton of Bethlehem steel. In fact, Bethlehem is a customer of *41 countries* around the globe.

In this world market, Bethlehem buys chrome, tin, tungsten, manganese, fluorspar, hemp, rubber, paper pulp and chemicals – to go into the steel itself or to be used in plant operations.

Buying so much abroad, Bethlehem is a factor in the economy of many countries – and, in turn, adds to each country's industrial strength by supplying needed steel products.

WORLD CUSTOMER

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Financial Digest

Watch the financial trends in Germany. They are the result of ever-higher gold and foreign currency reserves, and a desire to expand domestic business activity and rejuvenate the German capital market. For example:

The Bundesbank has cut the discount rate from 3½ to 3%, second such reduction this year. It is in line with the trend throughout Europe (page 1).

A new tax law frees 3-million Germans from paying any income tax. And the tax on distributed corporate profits is halved, to 15% (while undistributed profits will be taxed at 51% instead of 47%). The idea is to encourage the stockholder, a forgotten man in postwar Germany.

The Bundesbank has put another $75-million in hard currency at the disposal of the World Bank. It also renewed for three years $40-million worth of World Bank bonds which would have fallen due last month. That makes $250-million of the bonds in Germany's coffers.

Farbenfabriken Bayer AG, the chemical concern, has organized a Canadian holding company to attract foreign capital for Bayer's investment needs abroad. Bayer is turning all its joint-venture equity holdings abroad over to the new firm. For one thing, the Canadian tax laws are favorable to such an arrangement.

The Swiss franc—with an annual depreciation of 1.2%—takes top honors as the most inflation-resistant currency of the past decade, according to a tabulation of 24 countries by the First National City Bank of New York. At the opposite end, the Chilean peso runs away with the "booby prize"—with an annual depreciation of 25.5%.

Official cost-of-living or consumer price indexes were used as the value of money. The depreciation was compounded to get the annual rate.

	Value of Money		Annual Depreciation	Rates on Gov't. Bonds	
	1947	1957		1947	1957
Switzerland	100	89	1.2%	3.17%	3.65%
Germany	100*	87	1.5		5.50
Venezuela	100*	87	1.5	5.00	6.00
United States	100*	80	2.2	2.25	3.47
India	100	79	2.3	2.86	4.13
Belgium	100	77	2.6	4.45	4.69
Italy	100	74	3.0	4.43	6.81
Canada	100	70	3.5	2.57	4.17
Denmark	100	69	3.6	3.65	5.77
Norway	100	67	4.0	2.50	3.12
South Africa	100	66	4.0	2.63	4.75
Netherlands	100	66	4.1	3.06	4.58
Sweden	100	65	4.2	3.02	4.33
United Kingdom	100	62	4.7	2.76	5.01
New Zealand	100	61	4.8	3.00	4.82
France	100*	56	6.2	3.91	5.92
Mexico	100	49	6.9	9.94	10.32
Uruguay	100	47	7.3	5.09	5.61
Australia	100	46	7.5	3.17	5.02
Finland	100	39	8.9		8.00
Peru	100	37	9.5	6.66	7.69
Brazil	100	28	12.1		12.00
Argentina	100	16	16.5	3.20	3.28
Chile	100	5	25.5	9.40	12.58

*1948

Exceptions: mortgage bond yield in Germany; commercial paper in Mexico; prime loan rate in Brazil, Chile, Finland, Venezuela.

Portable Power

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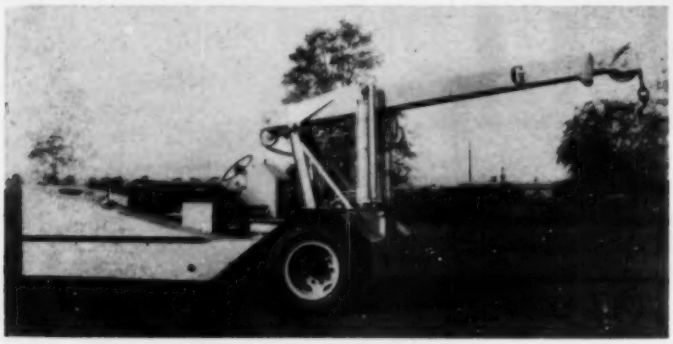


The neat materials-handler above and agile little truck at right exemplify how . . .

Today Lift Trucks Take on New Tasks

"DO ANYTHING, GO ANYWHERE" is only a slight exaggeration of what today's materials-handling equipment is meant to do. Not only do lift trucks have to lift more, raise higher, turn in narrow corridors, maneuver their way into boxcars, but they are being equipped more and more to meet the needs of a wide variety of industries.

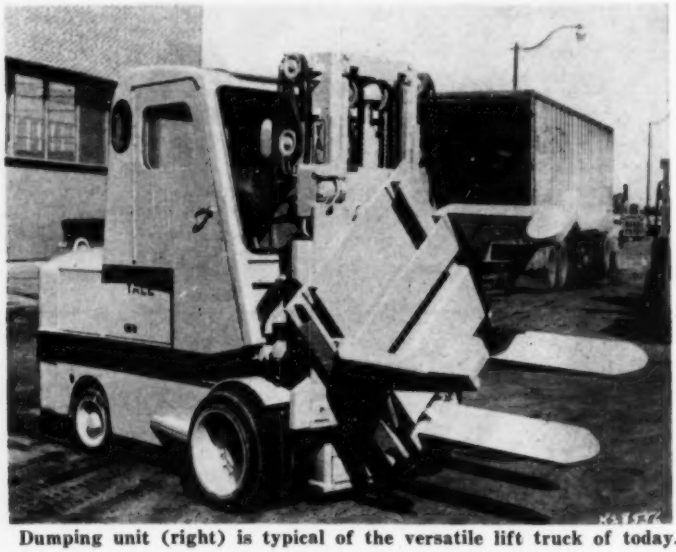
The mast-less Elbolift truck shown top right **(Automatic Transportation Co., Chicago 20, Ill., U.S.A.)** solves a problem of the canning industry—unloading boxcars of rolled tinplate stock shipped on pallets. The truck had to be designed to enter the 2.4 x 2.4-meter boxcar door, pick up the 6,795-kg. pallet and make intricate maneuvers inside the car. It does all this thanks to its special lifting mechanism (even without a mast, the load moves straight up) and rear-wheel steering.

Flexibility is the aim of the machine shown above left **(Grove Mfg. Co., Box 21, Shady Grove, Pa., U.S.A.)**. A hydraulic unit, it comes in 5, 8, 10 and 12-ton capacities. Booms for the first three models come in two and three sections and telescope from 2.4 to 7.2 meters from bumper and hook height to 9.6 meters.

Typical of small lift trucks that have to work in narrow warehouse or plant corridors is the British unit pictured below, left. This is a battery hand stacker with a lift capacity of 507.4 kg., capable of working in gangways less than 1.8 meters wide. It is model FSHP1 of **Lansing Bagnall, Ltd., Basingstoke, Hants., England.**

A rotating bin-dumping attachment is the latest addition to **Yale & Towne Mfg. Co.'s** industrial lift trucks **(11,000 Roosevelt Blvd., Philadelphia 15, Pa., U.S.A.)**. The attachment, which handles bins of various sizes and up to 3,624 kg. in weight, turns 360° in either direction. Two hydraulic cylinders control its upper arms as they move down to hold the bin in place against the attachment forks for rotating and dumping. ●

Crowded aisles (left) call for slim stackers.



Dumping unit (right) is typical of the versatile lift truck of today.

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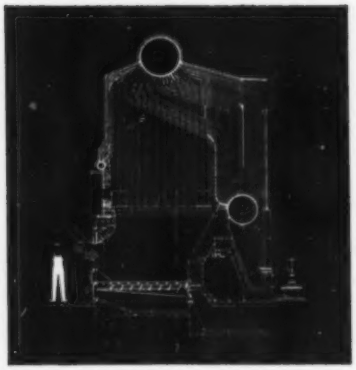
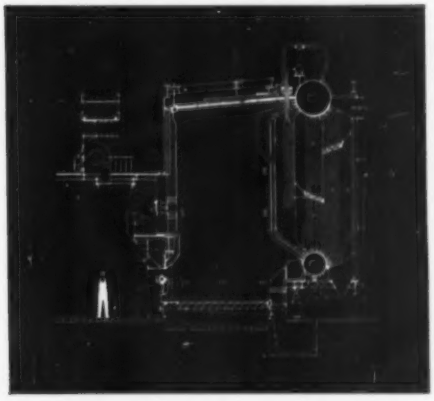
Combustion Engineering offers sugar mills a complete line of steam generating units equipped with stokers especially designed to burn bagasse better than can be done by any other method.

Such boilers, with a total capacity of more than 5,000,000 pounds of steam per hour, have been purchased for this service around the world.

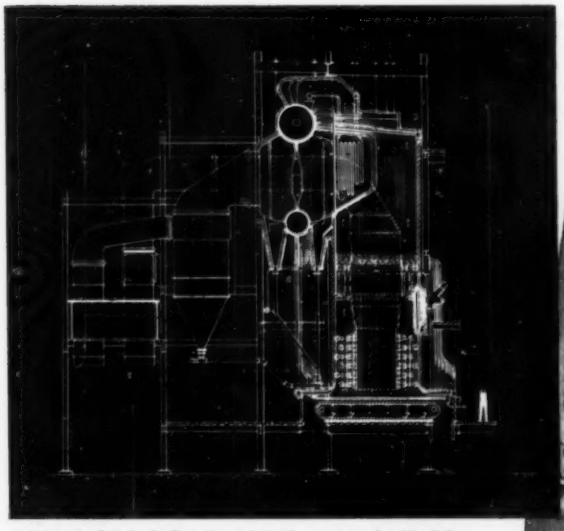
So—when you need equipment of this type buy from C-E, the company with extensive experience in your industry. Consult our representatives in your area, or our Export Department in New York.



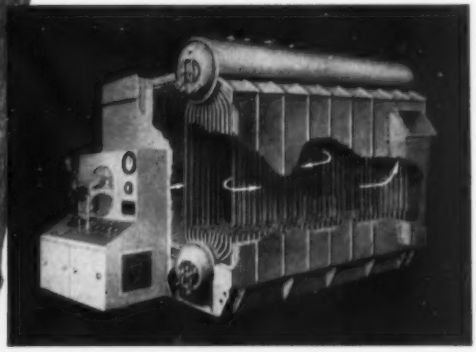
C-E Vertical-Unit Boiler, Type VU-10, equipped with C-E Bagasse Burning Stoker (Dump Grate Type). Units of this design are suitable for steam capacities up to about 45,000 pounds of steam per hour.



C-E Vertical Unit Boiler, Type VU-50, equipped with C-E Bagasse Burning Stoker (Dump Grate Type). This design is suitable for steam capacity requirements up to about 125,000 pounds of steam per hour.



C-E Vertical-Unit Boiler, Type VU-40, equipped with C-E High-Set Bagasse Stokers with continuous discharge traveling grate; tangential, auxiliary oil burners and tangential air admission are also employed. Especially suitable for steam requirements above 125,000 pounds of steam per hour.



C-E Package Boiler, Type VP. This oil or gas fired unit is especially suited for off-season and auxiliary steam needs. It is a complete, compact, shop-assembled boiler—simple and economical to install, operate and maintain.

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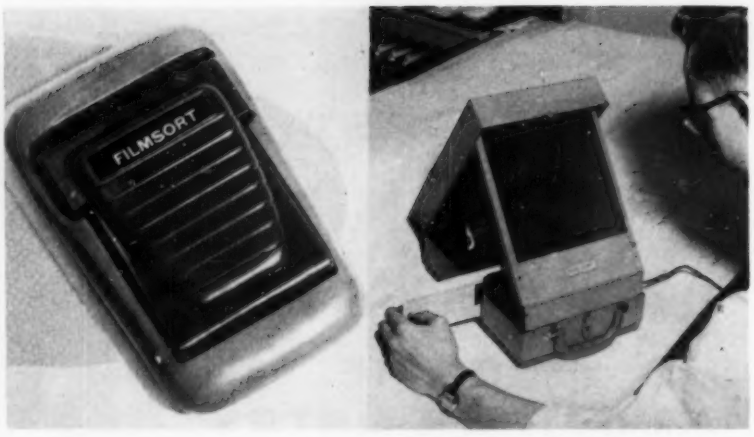
"Paging Mr. X"

One of the simplest and most efficient ways of paging is by a selective wireless system such as the Tele-Tracer. A busy person like a manager, maintenance man, doctor or hotel-owner carries a small 113-gram receiver in his pocket. A press of a button by the switchboard operator produces a buzz or flashing light in his receiver warning him that he is wanted. He then can take the message at the nearest 'phone.

The system, which is designed for use within a defined area like a plant or office, is a simple one with two main parts. The first and larger unit, a signal transmitter and loop amplifier, can be housed in an out-of-the-way place, and the second, a portable push-button control box, at the telephone switchboard.

Tele-Tracer systems can be adapted to as many as 360 receiving units. **N. V. Nederlandse Industrie Radio Artikelen, Emmen, Netherlands.**



Two Portable Microfilm Readers

Field engineers and office workers will be the chief users of these two microfilm viewers. Though differing in size, both are portable and low-priced, and each is designed to reproduce 35-mm. film in aperture cards.

The Inspector "25" on the left, a small unit weighing only 84.9 grams, is especially suitable for taking off a dimension or for fast reference to a drawing filmed at a 16 times reduction. Its magnification is three times.

The reader shown right, Inspector "50", magnifies approximately six times, enlarging the full microfilm frame on to a 20 x 20-cm. screen. There is sufficient storage space for about 200 aperture cards. **Filmsort Co., Pearl River, N. Y., U.S.A.**

ON SPAIN'S "PLAN JAEN" irrigation project this Cleveland "95" trencher is digging 90 kilometers of trench for the installation of 22-inch water pipe. The big irrigation project will transform a vast area of arid soil into fertile farm land. Fabrega Empresa Constructora, S.A. of Madrid owns and operates the versatile Model 95.

CLEVELANDS DIG, FILL and compact trenches of all types in all parts of the world:

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- drainage and irrigation systems
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TRENCHERS—7 models with a digging range of 8 inches to 52 inches wide.

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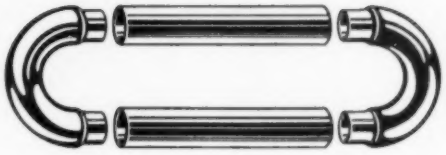
A complete range of sizes for condensers, cooling coils, etc., with plain or cupped ends. Both O. D. wall thicknesses and center-to-center dimensions carefully matched to customer's specifications.

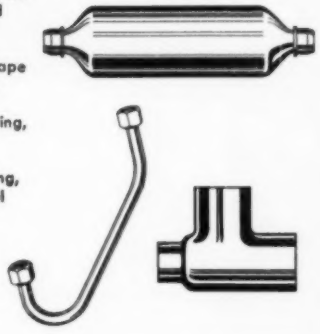


STANDARD AND REFRIGERATION TUBING

For all piping, refrigeration, and air conditioning requirements, Mueller Brass Co. Streamline copper tubing is available in all required wall thicknesses, and hard or soft tempers.

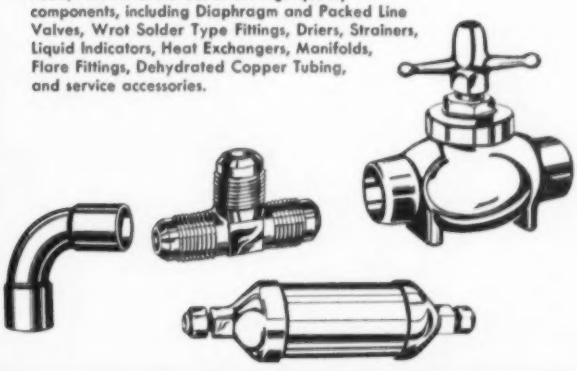
FORMED COPPER TUBE AND ASSEMBLIES

Mueller Brass Co. supplies formed copper tube and assemblies with special bending temper. Cut to customer's size and shape specifications. Complete facilities for swaging, bending, spinning, upsetting, flaring, flattening or sealing, beading and grooving, drilling, piercing, machining, joining . . . all at consistently close tolerances.



REFRIGERATION PRODUCTS

For virtually every refrigeration and air-conditioning need, Mueller Brass Co. offers high quality components, including Diaphragm and Packed Line Valves, Wrot Solder Type Fittings, Driers, Strainers, Liquid Indicators, Heat Exchangers, Manifolds, Flare Fittings, Dehydrated Copper Tubing, and service accessories.



APPLICATIONS

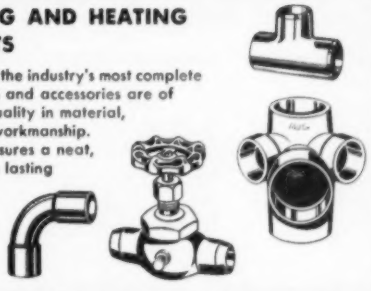
For sugar and paper mills, breweries, distillers, and other industrial applications, Mueller Brass Co. copper tubing is supplied to customers' specifications.

PACKING

Mueller Brass Co. can pack mixed groups of items for delivery to different job sites for any customer—an added saving to you by reducing rehandling costs.

PLUMBING AND HEATING PRODUCTS

"Streamline", the industry's most complete line of fittings and accessories are of the highest quality in material, design, and workmanship. Streamline assures a neat, efficient, long lasting installation.



PLASTIC PIPE AND FITTINGS

Rugged Streamline polyethylene plastic pipe and all types of fittings, both copper and plastic, are excellent for a variety of jobs where the flexibility of plastic is needed.

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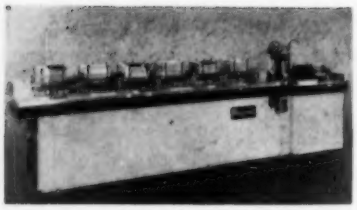


Automatic Brochure Folder

A new automatic machine will collate, saddle-stitch and fold catalog sheets in a single operation. It is designed to make all types of booklets and catalogs in sizes ranging from 7.5 by 12.5 cm. to 22.5 by 30 cm., and can work either with single sheets or signatures. 5,000 units can be completed in an hour, according to the maker. The machine is provided with an electronic quality control system to insure accuracy. **Parnat Business Machines Corp., 1816 Boston Rd., New York 16, N. Y. U.S.A.**

Computer for the Small Business

A new computer called the Mastermind 1500, said to be easier to operate than a typewriter, has been developed for small business operations. Price ranges between $800 and $15,000 depending on the model. The computer, which takes up about 1.6 sq. meters, can be used for inventory and sales information control; budget control; scheduling of equipment and manpower; processing of credit, accounts receivable and bank account information. **Matronics, Inc., 541 Lexington Ave., New York 22, N. Y., U. S. A.**

New Synthetic Rubber Resists Heat, Fluids

The chief virtue of Du Pont's new rubber, Viton, is its resistance to oils, fuels and solvents at temperatures over 400 F. Viton is thus finding its main application in seals (for aircraft, pumps, etc.), which today have to withstand very high temperatures. Other uses are for protective clothing, hoses, fuel cells, wire insulation, calking and paint, as well as mechanical parts such as gaskets.

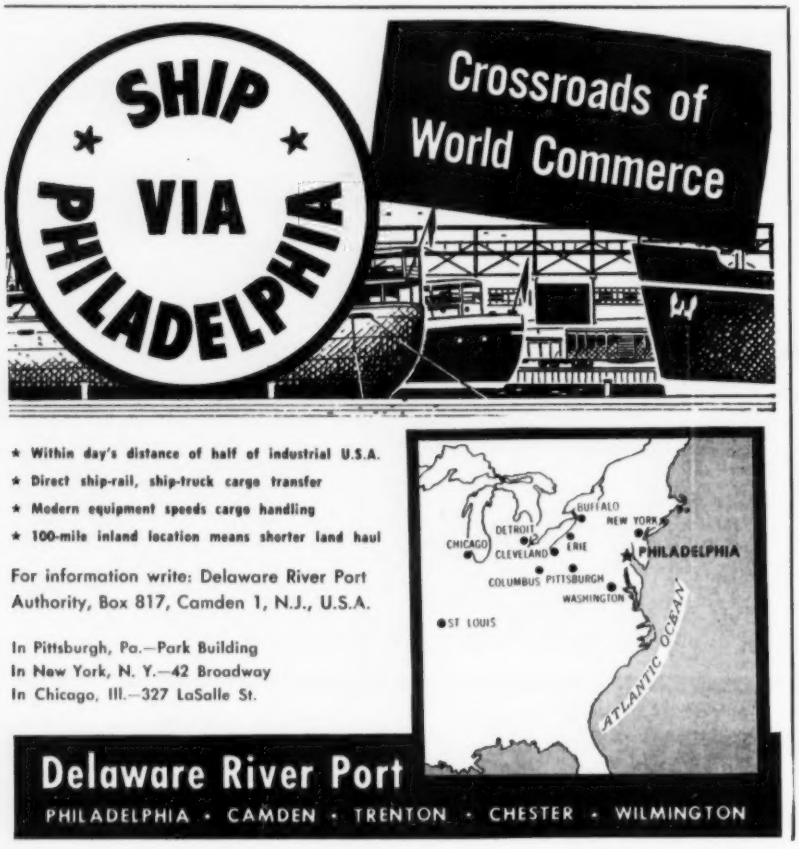
Experiments have also revealed resistance to compression set—a property often more valuable in mechanical goods than tensile strength. Specimens compressed 25% held 70 hours at 250 F, and recovered to within 90 to 97% of their original dimensions. **E. I. du Pont de Nemours & Co., Inc., Elastomer Chemicals Dept., Wilmington 98, Delaware, U.S.A.**

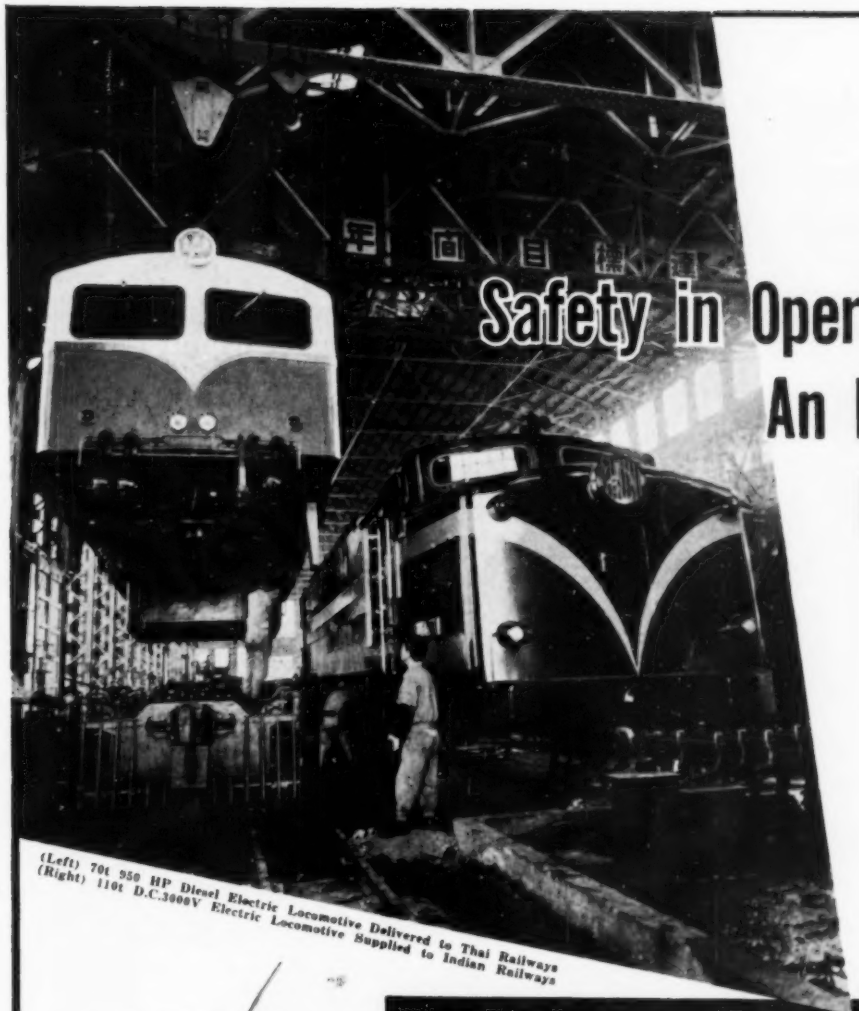
On-the-Spot Gas Detector

The Draeger Gas Detector and Gas Detector Tubes serve for tracing and determining concentrations of gas. No special skill is needed to operate them: The gas estimates can be read at the site of the test by a person who is not an analytical chemist, thus saving the time and expense of a visit to the chemical laboratory.

The detector tubes contain uniform amounts of reagents which are discolored on contact with certain gases. The air to be tested is forced through the detector tube by means of the gas sampling pump. While counting the suction strokes of the pump, the operator can tell, from the color of the tube, the concentration of the gas being detected. The indication is read either directly from the tube or from a corresponding table.

The kit, which weighs only 1.8 kg., can be used to detect about 25 different poisonous gases or vapors. **Draeger Werk, Moislinger Allee 53, Luebeck, Germany.**





(Left) 70t 950 HP Diesel Electric Locomotive Delivered to Thai Railways
(Right) 110t D.C.3000V Electric Locomotive Supplied to Indian Railways

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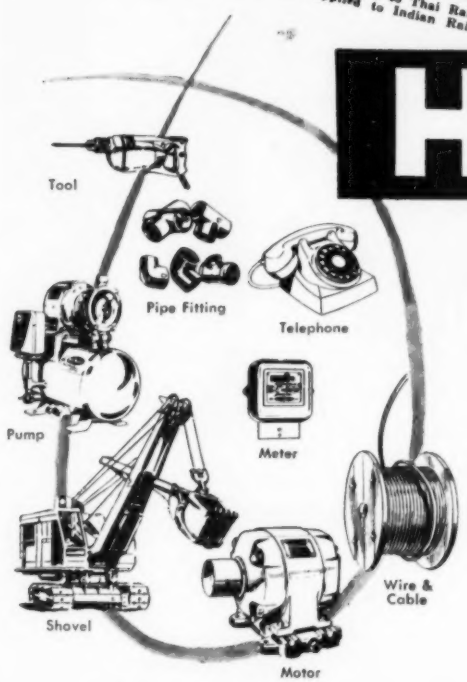

Hitachi, Ltd.
Tokyo Japan

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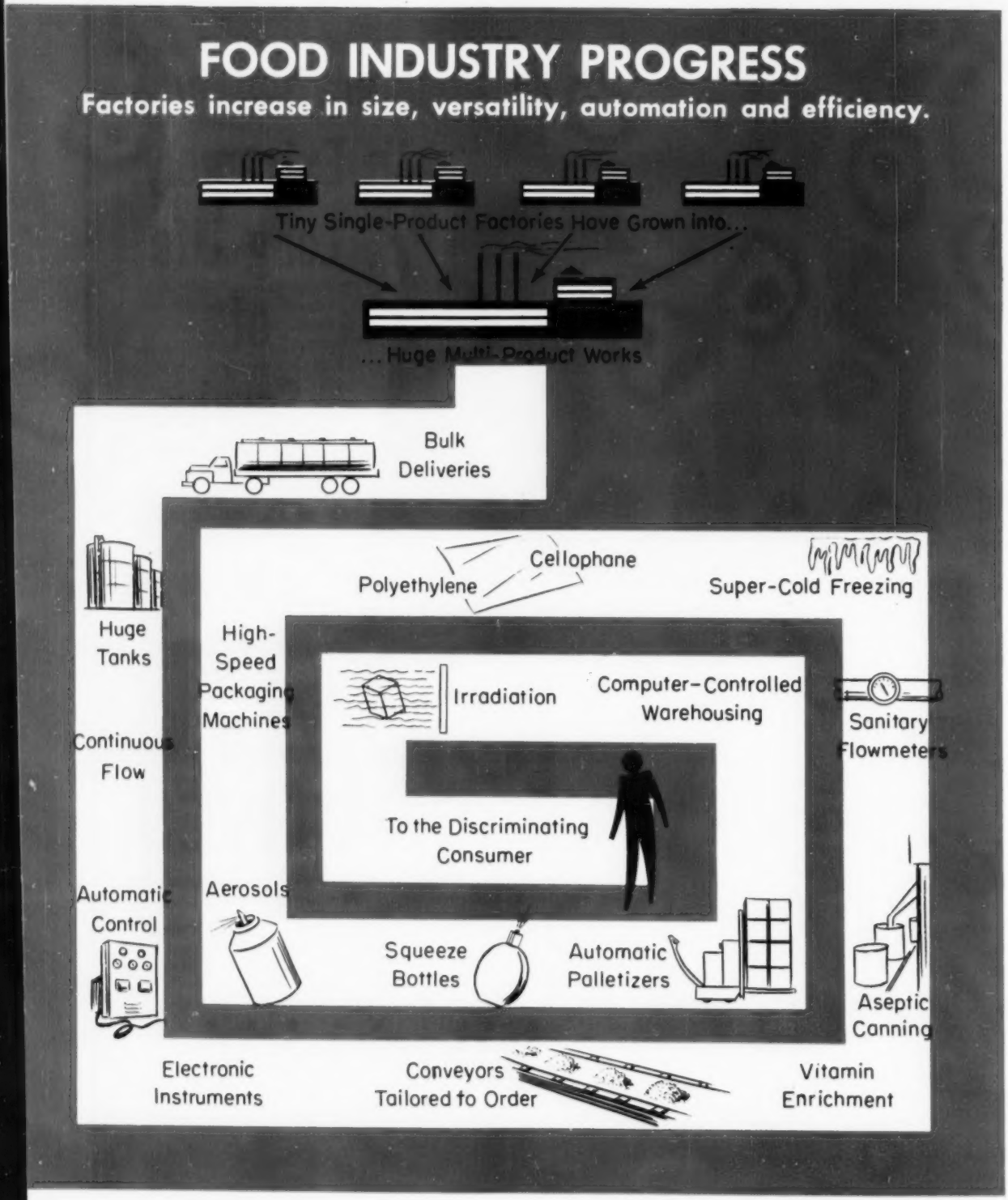
New Techniques,



New Packages, and New Tastes

Food processors are cutting costs and expanding their markets by automation, bulk handling and fancy packaging

ASEPTIC CANNING is one of the promising techniques now being advanced for increasing the world's supply of fresh and nourishing food. Like other landmarks of food engineering, the process is neither strikingly new nor a final answer. It is one of the scores of important discoveries coming out of the food laboratory, aimed at making the foods of tomorrow more plentiful, less costly, more nutritious, more conveniently packaged.

Fruit and vegetables normally are sealed in a can, then the entire package and product sterilized by heat. The end product is vastly different from the original produce in taste, texture, and nutritional value.

Aseptic canning would correct this disparity, and offer more of the flavor and quality of fresh produce in cans. To do this an ingenious system of sterilizing the can and the product must be set up, and the sterile condition maintained during assembly of product and package, and during filling and sealing.

Such techniques as aseptic canning illustrate the old and new in food technology progress. On the one hand, here is a continuation of the age-old effort to preserve the freshness of foods for extended periods. At the same time, the technique fits in with the most advanced thinking of plant engineers: It is itself an example of automation, and it lends itself to the fully automated food factory.

Automation, plus innovations in materials handling and packaging, are keys to the multitude of developments that have been taking place in the world's food industry in recent years. Food factories—in the U.S.A. and elsewhere—have been getting bigger and more versatile in output, according to studies made by *Food Engineering*. The magazine notes that this has enabled plants to take greater advantage of bulk shipments, in-plant handling of ingredients in bulk, advanced instrumentation, high-speed packaging machines, and new packaging materials.

Single - product manufacturers have grown into multi-product concerns in many areas of the world. Witness the wide variety of products marketed by such huge companies as U.S.A.'s General Foods, the British-Dutch Unilever, and Switzerland's Nestle (IMD, Feb., p 14). Nestle, for example, got started with a baby's milk formula, moved to chocolate, to coffee, then on to soups and other products — marketed throughout the world.

Small firms too have found that multi-product output is the only way to keep their businesses going profitably. An American vegetable cannery, for example, used to shut down when its crop was completed in the fall. But overhead expenses continued. Recently it adapted part of its asparagus production setup to canning tuna, shipped from Japan in frozen blocks. Now the factory runs all the year round, and overhead expenses are shared by several operations.

I. Automated Processing

Wherever you look, the trend is toward more and more "convenience food"—involving more elaborate food processing and packaging. In the U.S.A., the major emphasis for the past ten years has been on scores of quick-frozen fruits, meats, fish, desserts and, finally, entire meals. Europeans are following along on the frozen-food trail; they, as well as South Africa and Australia, are already exporting some quick-frozen delicacies to the U.S.A. But the trend is limited because so many countries still lack both the processing and home refrigeration equipment needed for wide-scale use of frozen food. Outside of North America, canning is dominant.

But canning as well as freezing operations normally can be made continuous. One of the major technical innovations in the food industry is the change from batch to continuous processing. The change has speeded up operations, and allowed substantial savings in material and labor.

An array of screw conveyors, belt conveyors, bucket elevators and mechanical shovels have taken over jobs once done by hand trucks. Their operation often is engineered by automatic controls and advanced instruments.

A refractometer on an orange juice concentrating line, for example, checks the density of the juice 480 times a second, and controls the blending of evaporated and cut-back juices by actuating pneumatic valves. Juice density is controlled to within 0.05 Brix.

High-speed continuous processing has forced quality control out of the laboratory and into the process line itself. In continuous operations, too much product goes unchecked in the time it takes to make a laboratory test.

New laboratory-type instruments have been incorporated into process lines to give continuous records of such variables as density, viscosity, and pH. In many cases, these instruments actuate process controllers that correct unwanted deviations continuously.

II. Handling Progress

Materials handling efficiency has grown side by side with automatic control and new production techniques. At most large food factories hand trucks have been replaced by industrial units, powered by electricity or diesel fuel. Accessories for these industrial trucks include special grabs, rams, booms, scoops, and crane attachments. (See also Product Digest.)

Also aiding in the efficient handling of raw and finished products are in-plant mono rail systems, water troughs that clean as they convey, pallets and automatic pal-

Some New Food Techniques

Plastic Dip for Meats—Flavor and moisture get imprisoned in an air-tight coating soon after roasts and other cuts are quick-frozen at temperatures of about —29 C. Meat cuts move by overhead conveyor from freezer, then are dipped successively into two chemical mixes.

The resultant coating displays frozen meat as attractively as fresh cuts—and cuts down on spoilage, waste, and shrinkage. At home, the housewife lets the encased meat stand at room temperature for 30 minutes, then cuts the plastic coating with a sharp knife. It comes off readily without sticking.

Electrostatic Smoking—Here is a technique that food engineers have adapted from industrial painting and dust-collecting equipment. When tiny particles of dust or smoke are given a high-voltage positive charge, they will gravitate to a ground or negative charge. Using this principle, technologists are smoking hams, bacons, and fish in 8 minutes—rather than the several hours in a smoke house.

The smoke gets its positive high-voltage charge as it passes through a 100,000-volt grid. The meat or fish, negatively charged or grounded, move into the curing chamber on an overhead conveyor. Smoke particles attach themselves to the food by electrostatic deposition.

Protein Fortification—Processors are increasing the protein quality of cereal products by direct addition of the valuable amino acid "lysine". Such items as wheat bread, cookies, and infants' pre-cooked cereal are being built up into high-quality proteins—with value comparable to milk, eggs, meat. With fortification, five slices of white bread attain the protein value of one egg. Rice and rye flour also can be upgraded.

Sanitary Flowmeters—The recent development of effective sanitary flowmeters has opened the door to complete automation in dairies and other liquid-food plants. Rotameters—which measure flow as a function of the movement of a plug within a tapered tube—have proven successful in continuous production of ice cream mixes. Food flowmeters must be rigidly sanitary, easy to inspect and clean, and have built-in protection against plant moisture conditions.

Dehydrofreezing—This new technique, which combines drying and freezing methods, shrinks the size of the final food product. The result: savings in containers, storage space, and handling.

Output from this new process generally goes to restaurants and other large institutional users. For example, peas are partially dried, then packaged and quick-frozen. Restaurants who have tested the product say that such peas look better after cooking than frozen peas, and surpass other packs in maintaining freshness, flavor and appearance while standing warm in a pot. Dehydrofrozen pimientos, carrots, apples, and apricots soon will be available in the U. S. A.

Sweetener for Cured Meats—Bacon that doesn't scorch and ham that is meatier in taste may be on their way with the use of an artificial sweetener rather than sugar as the curing agent. The sweetener—cyclamate Sucaryl—is not a carbohydrate, and therefore does not caramelize, scorch, or stick to the frying pan.

letizers. These palletizers, widely used now for handling cased goods, assemble cases into unit loads. The loads are then either stacked in warehouses or moved into freight cars or trucks.

The modern food factory has turned to handling almost every liquid and granular material in bulk lots. Flour and sugar come to the bakery in hopper trucks or railroad cars. Where sugar is to be used as a liquid—in beverages, canning, confectioneries—it often is delivered in that form, in railroad tankers or tank trucks.

Liquid shortening, wine, beer, molasses and milk, all today are being moved in bulk quantities. A Canadian brewery recently began shipping its beer to a bottling plant in tank trucks. A California winery is sending part of its product to other sections of the U.S.A. by sea-going tanker. And another entrepreneur forsees shipping fresh orange juice from Florida to Europe.

III. Processing & Packaging

A constant stream of new production and packaging techniques are finding their way to the food industry. A few of the more promising technical aids are detailed in the accompanying table.

Innovations in packaging include everything from aerosols and squeeze tubes to meat encased in skin-tight plastics. Newer packaging materials cover a wide range. Polyethylene has been replacing cellophane as the low-cost transparent packaging film. And newer plastic films such as saran, vinyl, and polyester are moving into commercial use.

Aerosol pressure-containers still appear to have a long way to go before they become commonplace for dispensing a wide variety of foods. A large international firm has been reported testing aerosols for dispensing chocolate sauces, but the results are still inconclusive. Others are trying to do the same with meat sauce. In the U.S.A., whipped cream topping is regularly dispensed from aerosol containers.

A wide variety of novel packages are now being test-marketed in America. Included are plastic bags—containing a complete serving of dishes. The goulash or veal

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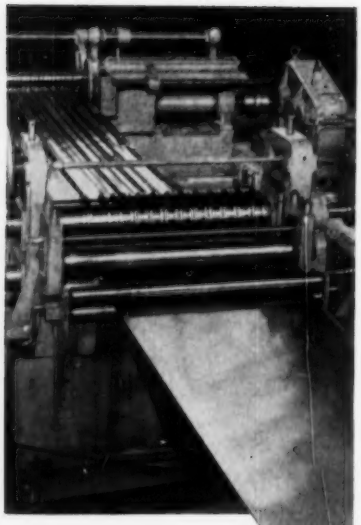

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scallopine is made ready for serving by dropping the food, bag and all, into boiling water. Meanwhile, cheese, honey, sandwich spreads, fudge sauce are among the items being packed in plastic bottles and tubes.

Coupled with the use of novel packaging materials has been a steady improvement in packaging machines. High-speed filling equipment recently introduced into U.S. food factories operates at the astonishing speed of 1000 jars per minute.

Most of this technical and marketing revolution got going in the U.S.A.—the land of supermarkets, frozen food, and ever-changing merchandising programs. But the world is becoming more closely knit in its buying and consuming patterns.

Supermarkets are going up in Latin America, just as they are throughout Europe. Convenience foods are increasing demand in every corner of the world. Now it is canned or dehydrated items but tomorrow—with more electricity and more refrigerators—it will be frozen foods.

It will, unless food preserved by irradiation—one of the most exciting prospects in food technology—becomes a commercial reality first (IMD, Mar., p37). Food subjected to atomic rays may prove a substitute for refrigeration. ●

Scholarship in Food Technology

U.S.A.'s FIRST graduate scholarship in food technology will be offered at Massachusetts Institute of Technology this fall under sponsorship of Chicago's Institute of Food Technology. An initial $1000 has been donated by the William Underwood Co. for getting the program under way.

The award is named after Samuel Cate Prescott, 86-year-old professor emeritus of food technology at M.I.T. Professor Prescott was active in basic research 50 years ago that led to modern canning techniques. He and associates in 1896 help isolate bacteria that led to spoilage in cans. They found that by boiling food at about 120 C for ten minutes such harmful bacteria could be destroyed.

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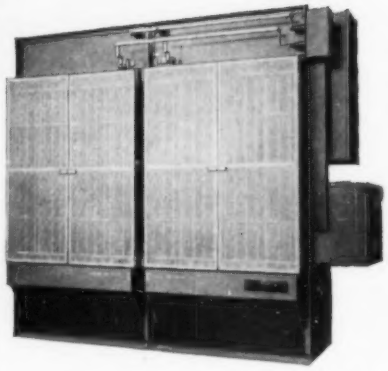

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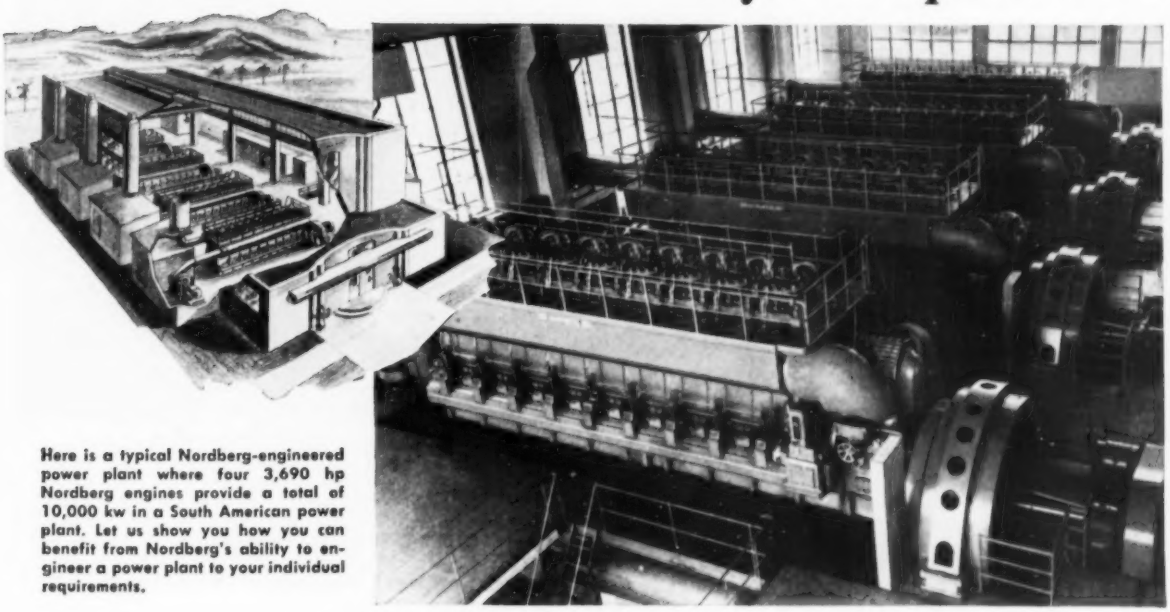

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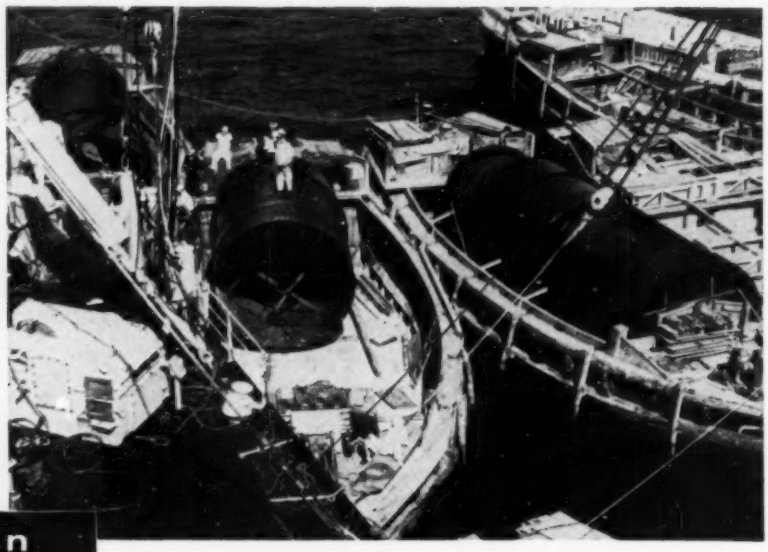

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The Care and Feeding of Inventories

Production Planning and Inventory Control discusses the policies and costs that affect inventory and production planning decisions. You will find effective methods for carrying out a sound inventory policy. 333 pages; $7.50. (McGraw-Hill Book Co., 330 W. 42nd Street, New York 36, N. Y.)

The Care and Feeding of Directors

The Director Looks At His Job will provide help in choosing the ideal Board. The book discusses the problems of the Board, how it should be constituted, and the nature of a director's duties (IMD, July, p 14). 150 pages; 23s or $2.75. (Oxford University Press, Amen House, Warwick Square, London EC4, England.)

A New Anthology on "MR"

Motivation and Market Behavior is a collection of articles covering the techniques, approaches, and appraisals of motovation research in marketing and selling. The book does not take a stand pro or con but it does give the perceptive reader enough information to reach his own conclusions about "MR". 437 pages; $7.80. (Richard D. Irwin, Inc., Homewood, Illinois.)

Business 'Round the World

African Economic Development does not attempt to tell all there is to know about all of Africa, but it does give the businessman an idea of Africa's vast economic potentials and needs. 307 pages; $4.95. (Council on Foreign Relations, 58 East 68th Street, New York 21, N. Y.) . . . Investors Handbook for Brazil—in English and Portuguese—explains what a foreign investor should know about putting his capital to work in Brazil. 50 pages. (Brazilian Government Trade Bureau, 551 Fifth Avenue, New York 17, N. Y.) . . . The Canadian Markets—another volume in the J. Walter Thompson World Markets Series—provides a statistical and descriptive analysis of this fast-growing market. 192 pages; $18.00. (McGraw-Hill Book Co., 330 W. 42nd Street, New York 36, N. Y.)

YOU

Personal Affairs

The Most Faithful Administratress

Of all the faithful administrators who keep a business ticking, few are more important—and probably none as faithful—as your personal secretary. Her job is simply to make you a better executive.

But if she resents the way you treat her, she may account for what the British magazine *Business* calls "some of the gremlins in your office"—the letters that are missed, the callers who are kept waiting, the messages that are not distributed. *Business* lists some of the traits that make a man a good boss, and deserving of a good female secretary:

He brings out maternal, not amorous instincts. She wants to look after him, not after herself.

He insists on quality. There is no fun doing one's best for a person who is quite happy with the second-best. A good boss creates a working atmosphere in which the second-best is simply unthinkable.

He is straightforward. She is happier seeing her boss as he is, and not as something he is not. He may be temperamental, irascible, demanding—but he gets things done. And he acknowledges good work with generosity.

He is considerate. Not that he remembers her birthday or brings her presents, but he does understand the problems of her job. There are a variety of ways to make her job—and your job—easier and more efficient.

Take the problem of dictation. To check up on your dictating mannerisms, you can make a recording of your voice. You might be horrified at your rambling thoughts. It could convert you to thinking out your letters in outline before calling in your secretary.

If she is a creative person, your secretary probably hates copy-typing. Encourage her to farm out routine chores. She is certainly capable of picking up full names, addresses, and references from the file correspondence—you don't have to dictate it all. Let her take over some of your routine correspondence.

Do you expect her to work your hours? If so, remember that you get paid to work all hours—but does she? At least you might offer her the price of an evening meal or taxi fare after staying on for late work.

Is her equipment adequate and up to date? Look it over. She might need more drawer space or an extra file—and she should certainly be consulted on the purchase of a new typewriter.

And not least of all, you should keep her informed of your movements. Contrary to popular opinion, a woman is not always a mind reader.

Notes about this and that: If you are a photographer, some exciting exhibits are coming up in Europe in the months to come. There is the big Photokina show in Cologne, Sept. 27—Oct. 5; the Louvain Photographic Salon, Aug. 31—Sept. 9; the International Amateur Film Festival in Cannes, Sept. 6-16. . . . The Russians and a British travel agency have worked out a 15-day, package tour of Moscow, Leningrad, and Kiev—complete with jet airline transport, a cruise on the Volga, an evening at the Bolshoi, and apparently a cocktail party with some Soviet political figures (un-named). The cost: $468 from London.

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Ford tractors produced in Highland Park, Michigan, make farming more productive and more profitable all over the world. The Model 960 Powermasters, shown here awaiting shipment, are equipped with power steering. To help provide trouble-free performance for the life of these tractors, Ford Motor Company uses strong, job-proved tubing, such as Bundyweld, for vital fuel, oil and hydraulic lines.

Why these steel-sinewed workhorses rely on lifelines of Bundy Tubing

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No inside bead
Uniform I.D., O.D.